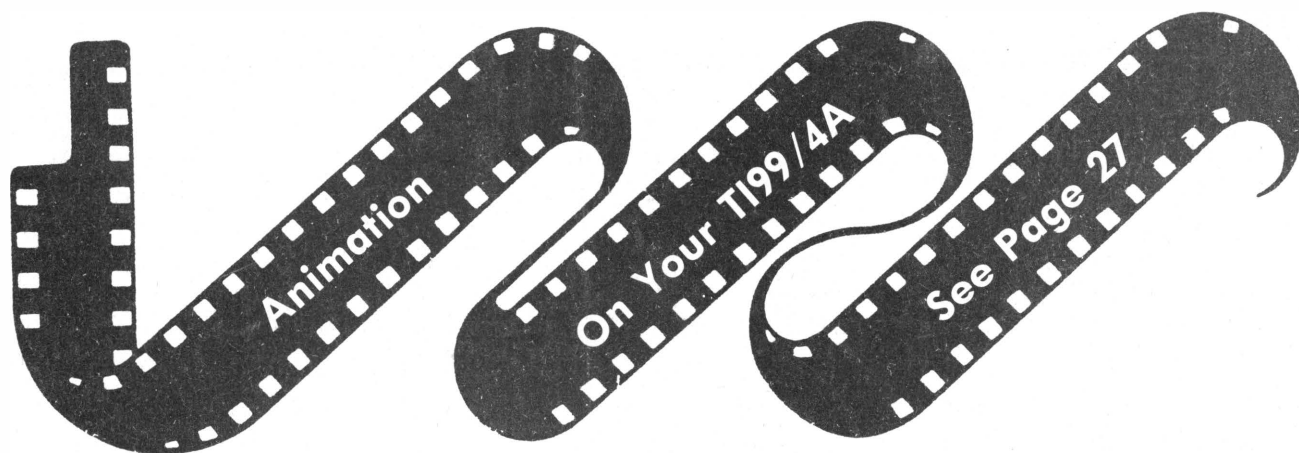

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July 1988

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**The start of John Birdwell's assembly language word
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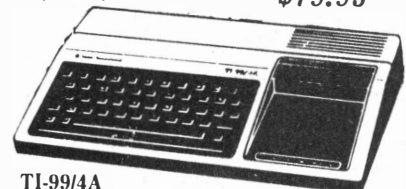
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Delphi TI NET: MICROPENDIUM

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Programming conventions

Here are some tips to help you when entering programs from MICROpendium:

1. All BASIC and Extended BASIC programs are run through Checksum, the numbers that follow exclamation at the end of each program line. Do not enter these numbers or exclamation points. Checksum was published in the November 1987 edition.
2. Long XBASIC lines are entered by inputting until the screen stops accepting characters, pressing Enter, pressing FCTN REDO, cursoring to the end of the line and continuing input.

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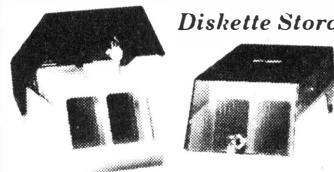
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Comments

Getting started with the Myarc HFDC

I've been using a Myarc Hard and Floppy Disk Controller with a 99/4A but not enough to review it. The version I had wasn't the final article and I returned it to Myarc last week to have it upgraded. I used it enough to be able to format it using the disk manager software that comes with it and to be able to create subdirectories and copy files to a hard disk. I'm using a 20-megabyte, half-height drive that I installed in a commercially available hard disk cabinet. It's a bulky package but I can't complain.

At this point, only the hard disk controller part of the card is operational. Floppy drives are still accessed via a regular floppy disk controller card (I'm using a CorComp controller with the 4A setup. It is similar in this regard to the operation of Myarc's older WDS/100 Winchester System that used a personality card to operate the hard disk drive and a normal floppy controller for the floppy drives. The biggest difference that I've noticed between the systems is that the Hard and Floppy Disk Controller can handle more and much larger hard disks with much faster disk access. The manager software is also much better than the WDS/100 software.

The HFDC doesn't work with the Geneve at this time, but it does provide a lot of possibilities for 4A users. It's definitely something to look into if you'd like very fast disk input/output, compared to floppies.

CANADIAN/FOREIGN PRICES GOING UP

Now that the new postal rates have been announced, we are making some adjustments. Our rates for Mexico will remain the same, \$25.25, and so will our airmail foreign rates, as we have changed our method of foreign air delivery. However, Canadian rates will go up as of Sept. 1 to \$27.50 U.S., and foreign surface mail will go to \$25 as of Oct. 1. Of course, as always, before that date our subscribers can renew at the old rate. We are honored to have subscribers on every continent but Antarctica.

NEW COLUMN STARTS

Our new assembly language column starts this month. Written by John Birdwell, the column is focusing on the creation of an assembly language word processor.

Because we've got only 40 pages this month, we had to cut the Charles Kirkwood's c99 column this month. We'll pick up the column next month when we'll have more pages.

Other items to look forward to in coming issues are a tutorial on telecommunications, a comparison of the major commercial telecommunications networks as they relate to the TI, a technical article on the 9918A video processor chip and more Extended BASIC games.

—JK

Reviewed in MICROpendium

1984

February: B-1 Nuclear Bomber, Tandon TM-100 Disk Drive, Void, Beantalk Adventure, Microsurgeon, On Gaming, Database 500.

March: Star Trek, Escape From Balthazar, Garkon's Getaway, Sky Diver, Mail-Call, Prowriter 8510 Printer.

April: Monthly Budget\$ Master, Budget Master, Home Budget, Thief, Donkey Kong, Khe Sanh.

May: Companion Word Processor, Q*Bert, Mad-Dog I & II, Programs for the TI Home Computer.

June: Creative Expressions Accounts Receivable/Accounts Payable, CDC 9409 Disk Drive, Starship Concord, Lost Treasure of the Aztec, ASW Tactics II.

July: Theon Raiders, Introduction to Assembly Language for the TI Home Computer, Game of Wit, Pole Position.

August: TE-1200, Tower, Galactic Battle, Galaxy.

September: Wycove Forth, 99/4 Auto Spell-Check, QUICKCOPYer, Wizard's Dominion, Anchor Automation Mk XII Modem.

October: Killer Caterpillar, ZORK I, Defender.

November: 9900 Disk Controller Card/Manager, Super Bugger, Transtar 120S printer, Floppy-Copy, Data Base-X.

December: Gravity Master, Data Base Manager System, Learning 99/4A Assembly Language Programming.

1985

January: Super Sketch, Foundation Computing 128K Card, PTERM-99, TI-Runner.

February: Super Extended BASIC, Beginning Assembly Language for the TI, ZORK II.

March: Morning Star Software CP/M Card,

WDS/100 Winchester Disk Drive, Sketch Mate, BMC Color Monitor.

April: 9900 Micro Expansion System, Disk + Aid, Gemini 10X-15X.

May: Character Sets and Graphics Design, Draw 'N Plot.

June: GRAPHX, DATA BASE I.

July: Acorn 99, Advanced Diagnostics.

August: Model Dow-4 Gazelle, TI-Artist, PC-KEYS, Not-Polyoptics' Bankroll.

September: Midnite Mason, Myarc 32K/128K Card, GRAPHX Companion.

October: 4A/TALK, Extende BASIC II Plus, XB Detective, Console Writer 2.a.

November: Foundation Z80A/80-column cards, 9900BASIC, Adventure Editor.

December: Display Enhancement Package, Triple Tech.

1986

January: BITMAC, Starcross.

February: Night Mission, Peripheral Diagnostic Module, BA-Writer.

March: Super Duper, Tunnels of Doom Editor, Business Graphs 99.

April: U.S. Open Tennis, PRBASE.

May: 4A Flyer, GRAM Kracker, Artist's Companion.

June: Myarc Disk Controller Card, Maximem.

July: Horizon RAMdisk, Old Dark Caves, Funlwriter, TI99/4A Macro Assembler.

August: JOYPAINT 99, GPL Assembler, TI99/4A Intern, GPL Linker.

September: Mechatronic 128K Card.

October: TI-Forth Utilities, CorComp Memory Plus.

November: Submarine Commander, PEP,

MAX-RLE.

December: GK Utility I and II and GRAM Packer, X-10 Powerhouse, RAVE 99/101.

1987

January: MG DISKASSEMBLER, Myarc XBII.

February: TI-Tax, Mechatronic Mouse.

March: Wycove Forth version 3.0, DIJIT Systems RGB Conversion Kit, Spad XIII Flight Simulator.

April: Geneve 9640, Disk Utilities.

May: QS-Solitaire, Geneve 9640 (Part 2), Technical Drive, Console Calc.

June: Character Sets and Graphic Design III, Writerease Ver. 1.1, 4A DOS, Prescan_It.

July: Junkman Junior, Avatex 1200/1200hc modem, Bubble Plane.

August: Prostick, The Brain, Rocketman, Menu Ver. 6.3.

September: TI-IBM Connection, Super Extended BASIC.

October: Fontwriter, Mechatronic 80-Column Card, Star NP-10 printer.

November: Legends, Music Preprocessor, QS-Wheel, Spin-to-Win.

December: Remind Me, Certificate 99, Myart-Art and Myarc Mouse.

1988

January: Quik Font, EZ-Keys.

February: Disk Utilities 4.0.

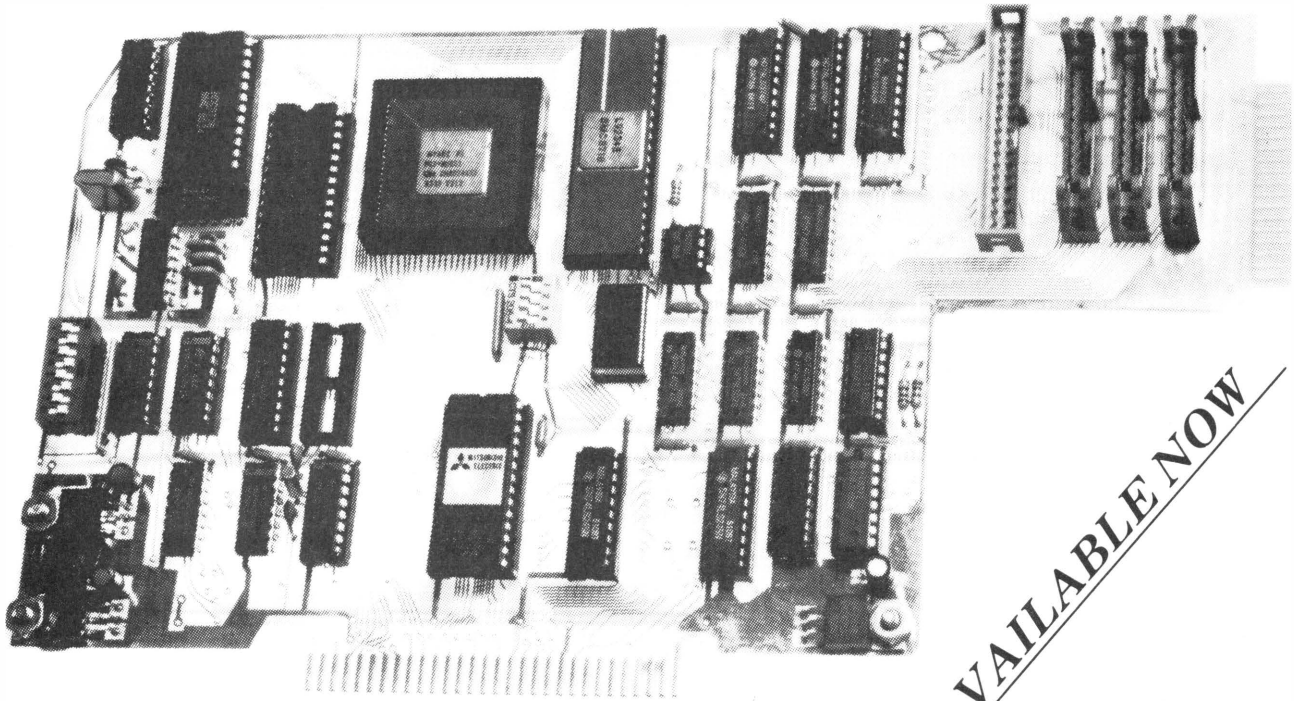
March: Telco, String Master, Epson LX-800 printer.

April: Super Space II, PC-Transfer, Calendar Maker, Archiver II.

May: Plus!

June: Captain's Wheel 32K Memory Expansion, Desk Tob Publisher Ver. 1.0, Texlink BBS.

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Feedback

Help Sister Pat help the elderly

Without meaning to sound "braggy," my "Woodstock's Christmas" demo program turned out to be a popular item with the TI community. In less than three weeks after its release on GENie and CompuServe, it made it all the way to Australia, all over Europe, Canada and the U.S.

During the first five months of this year, I had a virtual flood of requests for Woodstock and had practically no time to do anything with my TI, except record and return disks. Letter-writing, even to my closest long-time friends, was nearly impossible and I had to put a blanket thank-you note in MICROpendium to ease my conscience.

A few letters simply had to be answered. I must tell you about one. This wonderful person is one every 99er should know and call "friend."

I'm talking about Sister Pat Taylor, BVM, of Dubuque, Iowa. Sister Pat works in a nursing home, caring for elderly people, three of whom are more than 100 years old. She recently acquired a used 99/4A, a P-box (with two SS/SD drives) and is currently experiencing the "wonder" we all felt when we started to see what our marvelous orphans could do.

Besides the "usual" word processing, viewing demos, etc., she is also using her 4/A for the best use I have ever heard of, making little miracles! A few of her patients, due to age, terminal illnesses, etc., have withdrawn into "shells." Sister Pat found that running something on her 4/A stirred their interest. She used that to crack the shells and communicate with them!

Sister Pat has one big problem. She gets a total of \$10 a month for her personal expenses, which is what she must use for disks, printer ribbons, postage, mailers and donations she has been making to fairware authors. I mentioned this to Jim (Tiger) Peterson, and he immediately sent her disks of his music and demos, all free!

Now I'm thinking, why should Jim and I be the only ones to have all this fun? Why not ask all fairware authors to send Sister Pat a freebie? She'll put it to good use! For that matter, how about users' groups sending anything from your library? How about individual 99ers? You haven't written any

programs? You could send a few blank disks! She can always use those (or maybe that Flip'n'File you got for Christmas, which you don't really need) or even just a few dollars, to help out.

Hey, if you're one of the thousands of people who have my Woodstock and liked it but just forgot to send a little something, reach in your pocket, right now, while you're thinking about it, and send it, but not to me. Send it to Sister Pat Taylor, BVM, 1050 Carmel Dr. #456, Dubuque, IA 52001. (I'd love to see a letter from her in MICROpendium, saying she can't possibly answer all the letters she got.)

**Ray Kazmer
Sylmar, California**

(Kazmer included a copy of a letter from Sister Pat in which she says "Jim [Peterson] sent a disk of music and a disk called 09 which is out of this world in color. It is one kaleidoscope after another. One of the Alzheimer patients who is usually quite restless actually sat in my room over an hour watching, humming with Columbia, the Gem of the Ocean and even recalled a word here and there....At Christmas when I played our User Group Christmas songs and John E. Taylor's JET Christmas songs and hymns I had to list the program to convince one Sister in her mid-80s that it wasn't recorded....[because the kaleidoscope] involved no reading, and my monitor has sharp color, even the ones with sight problems could be amazed....The former music teachers all comment on what instrument a sound is like....")

Once more, TI cares

In regard to Bob Carmany's article "Memory with varied options," I have the following experience to offer.

Last summer we had a lightning strike near our home while I was on a business trip to Germany. My wife called me and let me know we had some problems.

Besides the freezer thawing, her inability to watch any TV because our pre-amplifier died, our two VCRs being wiped out and my son's C*m*d*r* computer biting the dust, I lost three TI consoles, one expansion box card, my CorComp disk manager, CorComp RAMdisk, a 32K memory card, the parallel port on my Star Micron-

ics Delta 10 printer and a few other items. I contacted each manufacturer to establish the repair prices and procedures for each item and when I contacted TI (dial 1-800-TI-CARES) I was told what to do to return each item and how much to repair them. I sent all my TI items with the appropriate checks and letters requesting an *itemized* repair bill and a *statement* of the *cause* of the damage so that I could claim the repair on my *homeowners insurance* and I waited.

A few weeks later I started receiving my repaired merchandise back and was a little surprised to "not" receive a statement or certification from the repairing technician from TI. Well, my insurance deductible was about half my loss and the TI stuff was about that much, so I was (angry)! So I called TI and explained that I really needed those technician statements. They explained that they couldn't do that because of the way their system operated and after a bit of talking back and forth, they said they would get back with me. A week or so later I began receiving checks from TI. In the end I was reimbursed by TI for all the items I sent them for repair. I guess this was their way of making up for their lack of ability to respond to the technician statements my insurance company required.

So don't think that just because your TI died or you have a problem you have nowhere to go. TI does care (in a way). And they still do repair their 99s.

**Gerry Evans
Warrenton, Virginia**

Fix was published

Re "Comments" June 1988, the solution for TI-Forth's GRAPHICS2 mode not working on the Geneve — one of the items mentioned near the end of the list of fixes asked for by Geneve users — was provided in my Forth article in the same issue. The solution is to change 0FFF 4 VWTR on line 11 of screen 54 (CONVERT TO GRAPHICS2 CONFIG) to 07 4 VWTR. Though I have not personally verified this on a Geneve, this is the correct setting for register 4 to place the starting address of the PDI at >2000. Credit for finding this bug goes to David Allen of San Diego.

**Lutz Winkler
San Diego, California**

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BASIC

Learning the A-B-Cs

By REGENA

Summer vacation is here, and my children have been spending a lot of time playing computer games. My two-year-old also wants to use the computer, so the older children were trying to find programs he could use. He already knew the "S" key and "D" key that are used for TI-Innovators (the left and right arrow keys), but we decided educational programs would be better for him.

My favorite command modules for toddlers are Early Learning Fun from Texas Instruments and Early Reading and Addition and Subtraction from Scott, Foresman. If you have toddlers or preschoolers in your family, these modules are a "must" in your program collection.

Many of you may recall that my son Randy was born in 1980, the year I started doing a lot of work with the TI computer. Since he had an older sister who did everything for him, he didn't talk very early. One of the stories that I tell about him to computer user groups is that he loved to play with his "puter" while I was working on my computer. We got the speech synthesizer and the Early Reading command module. This module has cute stories with the words written on the screen, and the computer talks. I noticed that Randy would repeat words the computer said. Some of the stories had "elephant," "tiger" and "astronaut." He soon learned the words of the computer stories. He still didn't say "Mom" or "Dad," but at least he was talking. I told the Scott, Foresman company they should have included a story about Mom and Dad.

Well, Brett Lynn (my present two-year-old) talked early and is now the one ready for the preschool programs. He likes the Early Learning Fun module and is learning the letters of the alphabet. However, I thought it would be better for the computer to say the name of each letter as it appears on the screen (Early Learning Fun was produced before the Speech Synthesizer was developed.)

This month's first program is written in TI Extended BASIC because speech is used. (Both programs required Extended BASIC and a speech synthesizer.)

"Alphabet" is a simple adaptation that shows the capital letter on the screen and says the name of the letter. The child must then find the letter on the keyboard and press the proper key. When the key is pressed, the name of the letter is repeated. Sprites are used for the letters so they can move across the screen.

```

100 REM TI EXTENDED BASIC !0
74
110 REM SPEECH !114
120 REM !154
130 REM ALPHABET !251
140 REM !154
150 CALL CLEAR !209
160 CALL MAGNIFY(2) !223
170 FOR A=65 TO 90 !164
180 CALL SPRITE(#1,A,2,90,10
,0,30) !152
190 A$=CHR$(A) !167
200 CALL SAY(A$) !039
210 CALL POSITION(#1,DR,DC) !
201
220 IF DC<110 THEN 210 ELSE
CALL MOTION(#1,0,0) !240
230 CALL KEY(0,K,S) !187
240 IF S<1 THEN 230 !239
250 IF (K=A)+(K=A+32) THEN 27
0 !043
260 CALL SOUND(100,330,2)::
CALL SOUND(100,262,2):: GOTO
230 !057
270 CALL SAY(A$) !039
280 FOR C=1 TO 20 :: CALL CO
LOR(#1,7):: CALL COLOR(#1,2)
:: NEXT C !190
290 CALL DELSPRITE(#1) !126
300 NEXT A !215
310 END !139

```

By the way, when Randy learned the letters from Early Learning Fun, he did not learn them in alphabetical order. The letters appear randomly in the program. I noticed he knew all the letters and he knew where they were on the keyboard — but he could not say the alphabet (and he learned to type before he could print).

This first program goes through the letters in alphabetical order. To modify the program so the letters appear randomly, change the following lines:

```

130 REM LETTERS (RANDOM)
170 RANDOMIZE :: A=(26*RND)+65

```

300 GOTO 170

You may SAVE this second program with a different name or on a different cassette. A random letter will appear on the screen and is named. The child needs to press the key with that letter, then the letter is said again. The screen clears, and another letter appears. The program continues indefinitely (press FCTN-4) to stop).

Line 150 clears the screen. Line 160 uses CALL MAGNIFY(2) to make the letters the large size sprite. Line 170 defines A for the character number. In the first program, there is a FOR-NEXT loop for all 26 letters of the alphabet in order. In the second program, a random letter is chosen.

Line 180 defines sprite #1 for the letter. The color 2 is black. The sprite starts in row 90 and column 10 and moves at a speed of 0 dot rows and 30 dot columns.

Line 190 defines the string A\$ so line 200 can use CALL SAY to say the letter. Lines 210-220 check the position of the sprite and stop the letter when it is near the middle of the screen.

Lines 230-240 wait for the child to press a key. When a key is pressed, line 250 checks to see if it is the correct key matching the letter (either the shifted or unshifted key may be pressed). Line 260 sounds an "uh-oh" sound if the key pressed is incorrect, and the computer goes back to line 230. If the key pressed is correct, line 270 says the name of the letter, and line 280 blinks the letter by changing the color of the letter.

Line 290 deletes the sprite, and line 300 goes to the next letter. Line 310 ends the program.

LOWERCASE LETTERS

Most reading teachers say that as the child learns the letters he should learn to identify the lowercase letters as well as the capital letters right from the beginning. The following program uses the same programming as the first program above but redefines characters so the lowercase letters are displayed. The child then matches the uppercase letter on the keyboard with the letter on the screen.

(See Page 10

TI BASE

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- Structured command language; local variable creation, nested command files, and complete logical language.
- Complete mathematical functions; arithmetic, logical, trigonometric, and Boolean.
- Disk management functions; catalog and format disks, copy and delete files.

The System

TI BASE offers many features and capabilities not currently found in any other 99/4a database system, such as:

- Database capabilities: supports five active databases; each database can consist of 16129 records, with 17 fields per record, and 255 characters per field.
- Command (program) file editor.
- Powerful command (program) language.
- System status/setup; allows the definition of disk location, printer configuration, date stamping, and other miscellaneous functions.

Not only is TI BASE powerful, but it is affordable as well. For only \$24.95 (plus \$2.50 for shipping) you get the TI BASE system disk, a TI BASE tutorial disk, a TI BASE keyboard overlay, and a comprehensive instruction manual. To start using TI BASE you will need a disk system, 32K memory expansion, and either an Extended BASIC, Editor/Assembler, or Mini Memory cartridge.

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In the December 1987 issue of MICROpendium, Remind Me! received a straight "A" review. Reviewer John Clulow wrote: "Serving the same function as a desk calendar, Remind Me! ... is easier, faster and more fun to use. The clarity of the manual and the program design make learning to use Remind Me! effortless. I use Remind Me! on a daily basis and would highly recommend it to anyone who uses a computer regularly. You'll be surprised at how useful it will be."

A graphical calender with pop-up windows allows entry of data for each day. The schedule can be quickly searched. You can print out an entire monthly schedule, a selected range of dates, or just individual days. You can even print to a TI-Writer file!

Customize Remind Me! for your own system! Choose screen colors, printer codes, printer device, default drive, and more. All configuration data is saved as part of the program.

While a clock is *not* required, the CorComp Clock Peripheral, CorComp Triple Tech Card, MBP Clock Card, the John Clulow Clock board, or MYARC 9640 will display the current time as you work. It will also provide the current month as the default when you beginning a session.

For Super Space Cartridge owners, a version of Remind Me! is provided so that you can have the program on your main TI menu.

Remind Me! runs on a TI-99/4A or the MYARC 9640, and requires Editor/Assembler, TI-Writer, a Super Cart, or Extended BASIC.

Remind me! sells for \$15.

PC-Transfer

PC-Transfer by Mike Dodd is the fastest and most convenient method available to move data between a TI-99/4A or MYARC 9640, and an MS-DOS machine. Just place an MS-DOS disk in one disk drive and a TI disk in another and PC-Transfer does the rest!

PC-Transfer allows you to catalog an MS-DOS disk and select the files you wish to copy to the TI disk. You can even search for files in sub-directories. All file selection is performed with a Disk Manager 1000 style screen, so you can look through all the file names before making your choices. You then enter a TI filename for each of the files, and PC-Transfer converts all selected MS-DOS text files into Display Variable 80 files that can be used in TI-Writer or MY-Word! And of course, PC-Transfer allows you to catalog a TI disk, select files, and write them out as text files on the MS-DOS disk.

In the April 1988 issue of MICROpendium, publisher John Koloen gave PC-Transfer an Overall "A" review, writing : "PC-Transfer is a fine utility for anyone who needs to transfer documents between PC's and TI or Geneve." And how easy is PC-Transfer to use? MICROpendium said "most users won't even need to skim the manual."

Because you might not have an MS-DOS disk initialized when you need it, PC-Transfer provides a convenient initialize function, supporting four MS-DOS disk formats.

PC-Transfer is ready for the future. A special loader feature allows new conversion routines to be added - conversions that could allow transfer of graphics, spreadsheets, and more.

Running on both the TI-99/4A and MYARC 9640 computers, PC-Transfer requires a CorComp or MYARC disk controller, two disk drives (or a RAM disk), and either Extended BASIC, TI-Writer, or Editor/ Assembler.

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- To place an order, please send check or money order plus \$1 for shipping and handling to:
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 - Credit Card orders (Visa, MC, AmEx) may be placed through Disk Only Software at 1-800-456-9272.
 - For a complete catalog of Genial Computerware products for the TI-99/4A and 9640, send a self addressed stamped envelope to the address above.
 - Remind Me! is currently in version 1.2, and PC-Transfer i n version 1.1. Owners of previous versions may upgrade by sending \$3 along with their original disk to Genial Computerware.

Demystifying assembly

By JOHN BIRDWELL

The intent of this column is to de-mystify assembly language on the 4A and the 9640. I will not repeat the basics which were covered earlier in a series of articles by Mack McCormick so you may want to review those before you begin. (See issues October-December 1985 and February 1986.)

One of the most difficult things about assembly language is that it seems to take so long to get meaningful results from your work. Most columns or news articles on this subject tend to give you bits and pieces of information but not enough to give you an overall understanding of this powerful language. In an attempt to avoid this my intent is to utilize the development of a meaningful program as a basis for conveying my knowledge on this subject.

The program we will be developing will be a word processor which will work on both the 4A and the Geneve. In honor of this publication we will call this program MICRO-WORD. Before you say we already have TI-Writer why do we need another word processing program, think about how many times you said to yourself 'wouldn't it be nice if only I could do this with TI-Writer.'

Well now is your chance because you will decide what features this program will have. I am requesting your input on the direction we should take. Please send your input to me or any questions you may have in care of MICROpendium.

The ground rules with regard to the program are as follows.

While we will incorporate some of the features of TI-Writer we will not duplicate it.

We will maintain file compatibility with TI-Writer.

Popular demand will decide what is included. Aside from that anything REASONABLE goes.

A few ideas I have to kick this off are: full editing through block move, delete, insert (instead of the line edit capability of TIW). The use of control codes to control a printer instead of dot commands. The ability to generate strings of characters through a single key stroke. Dual document processing with the ability to move text between documents.

This is not an existing program that I am using so remember these are only ideas and will not be included unless you request it.

I will be using fully commented listing a the means of explaining assembly language unless there is an area which I feel dictates separate explanation. Throughout this development there will be many several separate files which will be a part of the assembly process. So that we can keep everything straight as time goes by please utilize the file name that is indicated as we will be adding, changing and deleting from these files.

To assemble a program with multiple files you need to use the copy directive. For example to assemble the files included with this article you should generate a file, we will call it MICRO-SRC, containing the following statements.

```
COPY "MICRO-EQU"
COPY "MICRO-INIT"
COPY "MICRO-MAIN"
COPY "MICRO-DISP"
COPY "MICRO-KEYS"
COPY "MICRO-END"
```

You would then use this file when the source file name is re-

...my intent is to utilize the development of a meaningful program as a basis for conveying my knowledge on this subject — John Birdwell

quested. Upon successful completion of the assembly process we will then convert the resulting object code file into an E/A 5 program image file. To do this you will need to use the SAVE utility which was included with the TI Editor/Assembler. The step by step process to do this is as follows.

Load SAVE (E/A option 3)

Load MICRO-OBJ (Or whatever name you chose for the object file).

Press Enter.

You will now be requested to input a PROGRAM NAME. This SAVE. At this point you should have display providing you with information about the save process and requesting you to enter a FILE NAME.

Enter DSK?.MICRO-WORD (?=your drive number).

After the conversion has completed press ENTER to return to the E/A options screen. You can now load MICRO-WORD by selecting option 5 and entering DSK?.MICRO-WORD for a file name.

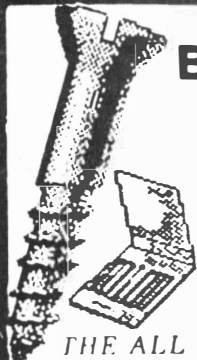
The SAVE utility loads into low memory starting at address hex 2800 and the E/A option 3 utilities occupy most of the rest of low memory so you can not AORG a program to load there as it will messup what is there and the result will be a locked console.

The code provided this month will not be very functional but will hopefully provide us with a good base to begin our development. Enough about what we are going to do lets begin.

Readers with suggestions or questions for Birdwell regarding this assembly project may write him in care of MICROpendium, Attn: John Birdwell, P.O. Box 1343, Round Rock, TX 78680.

MICRO-WORD

```
*****
* MICRO-WRITER PART I
*****
*
***** Filename = MICRO-EQU
*
      DEF  SLOAD,SFIRST,SLAST
SLOAD
SFIRST 0 @INIT          * GO DO INITIALIZATION
*
MAINWS EQU >8300         * USE PAD FOR FAST WORKSPACE
VDPWS EQU >8320          * PAD WS FOR VDP
VDPWA EQU >8C02          * VDP WRITE ADDRESS
VDPWD EQU >8800          * VDP READ DATA
VDPWD EQU >8C00          * VDP WRITE DATA
LINLEN EQU 40            * LENGTH OF A DISPLAY LINE
*
ITSA% DATA 0            * FLAG TO DENOTE RUNNING ON A 9640
(See Page 16)
```



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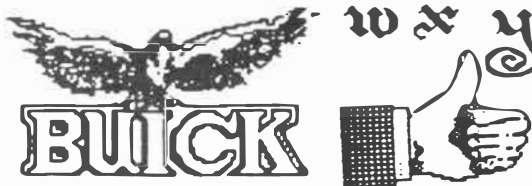
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ASSEMBLY—

(Continued from Page 14)

```

; NOTE THE >BXXX BELOW INDICATES VDP WRITE REGISTER ACCESS
VDP4A DATA >8000      ; VDP R0 >00 SETS E/A MODE
      DATA >81F0      ; VDP R1 >F0 SETS TEXT MODE 40x24 SCREEN
      DATA >8200      ; VDP R2 >00 SETS DISPLAY TO START AT >0 OF VDP
      DATA >8401      ; VDP R4 >01 SETS CHAR. TABLE TO START AT >0000
COLOR DATA >87F4      ; VDP R7 THE >F SETS CHAR. >4 SETS BACK. COLORS
      DATA 0          ; DENOTES THE END OF THE TABLE

;
VDP96 DATA >8004      ; VDP R0 >04 SETS TEXT MODE 2 (00 COLUMN)
      DATA >81F0      ; SAME AS 4A
      DATA >8203      ; VDP R2 >03 SETS DISPLAY TO START AT >0 OF VDP
; NOTE: ALTHOUGH AM THE 9938 PROCESSOR THE CHARACTER TABLE SHOULD BEGIN
; AT >1000 WE WILL FOLLOW MDOS AND START AT >0000
      DATA >8401      ; VDP R4 >01 SETS CHAR. TABLE TO START AT >0000
      DATA >87F4      ; SAME AS 4A
      DATA 0

; VECTOR TABLE FOR CONTROL KEYS VALUES HEX 0 - 1F
CTLTAB DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL , A B C
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL D E F G
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL H I J K
      DATA IGNORE,ENTKEY,IGNORE,IGNORE ; CTRL L ENTER CTRL N O
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL P Q R S
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL T U V W
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL X Y Z .
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; CTRL ; = 8 9

;
; VECTOR TABLE FOR FUNCTION KEYS VALUES >B1 - BF ENTRY IS KEY VALUE MINUS >B1
FTNTAB DATA IGNORE,IGNORE,IGNORE,IGNORE ; FCTN 7 4 1 2
      DATA QUIT,IGNORE,IGNORE,BACK      ; FCTN = 0 3 S
      DATA FOR,DOWN,UP,IGNORE          ; FCTN D X E 6
      DATA IGNORE,IGNORE,IGNORE,IGNORE ; FCTN 5 9

;
KYBWS BSS 32          ; WORK SPACE FOR KEYBOARD USE
CTIME DATA 0         ; CURSOR BLINK TIMER INCREMENTED BY TIMER
RTIME DATA 0         ; KEY REPEAT TIMER INCREMENTED BY TIMER
EOS DATA 0           ; END OF SCREEN ADDRESS
EOE DATA 0           ; END OF INPUT DISPLAY
ONELIN DATA 0        ; THE LENGTH OF A LINE 40 FOR 4A 80 FOR 9640
;
CURDEF DATA >3C24,>2424,>2424,>243C ; CURSOR DEFINITION
;
SPACE BYTE ' '        ; SPACE CHARACTER VALUE
HICHAR BYTE '~'       ; HIGHEST DISPLAY CHARACTER
LOWFTN BYTE >B1       ; LOWEST FUNCTION KEY VALUE
MAXFTN BYTE >BF       ; HIGHEST FUNCTION KEY VALUE
LSTKEY BYTE 0         ; LAST KEY HIT
CR BYTE >0D           ; CARRIAGE RETURN VALUE
FF BYTE >FF           ; VALUE OF NO KEY PRESS
EVEN

;
;
;*****Filename = MICRO-INIT
;
INIT LWPI MAINWS      ; LOAD WORKSPACE REGISTERS
      MOV 00,R0        ; MOVE THE INSTRUCTION AT LOCATION 0 TO REG. 0
      CLR 00          ; TRY TO CLEAR THIS LOCATION TO A NULL (>0000)

;
; IF WE WERE ABLE TO CHANGE THIS LOCATION TO A ZERO WE MUST BE
; RUNNING A ON 9640 SINCE IT IS ROM ON A 4A WHICH CANNOT BE CHANGED
; ON A 9640 IT IS RAM AND THEREFORE WORKS LIKE ANY OTHER MEMORY LOCATION
;
      LI R1,VDP4A      ; ASSUME THIS IS A 4A FOR VDP SETUP
      LI R2,LINLEN*24   ; FULL SCREEN SIZE
      LI R3,LINLEN      ; LENGTH OF A 4A LINE
      LI R4,LINLEN*22   ; 22 LINES FOR INPUT
; THE 'C' INSTRUCTION COMPARES THE CONTENT OF MEMORY/REGS.
      C  R0,00          ; IF IT IS NOW A ZERO THEN WE ARE ON A 9640
      JEQ ITSA4A        ; IF THEY ARE EQUAL THEN THIS IS A 4A SO JUMP

```

```

; SET0 SETS A MEMORY LOCATION OR A REGISTER TO ALL ONES (>FFFF)
SET0 @ITSA96          ; SET 9640 FLAG
SLA R2,1              ; DOUBLE THE SCREEN SIZE TO 80x24
SLA R3,1              ; SET LENGTH OF A LINE TO 80 FOR 9640
SLA R4,1              ; 80x22 AREA FOR INPUT
LI R1,VDP96           ; SETUP TO USE THE VALUES FOR A 9640 VDP
; NOW THE VDP(9918A ON THE 4A OR 9938 ON THE 9640) MUST BE SETUP
; THIS IS DONE THROUGH THE VDP WRITE REGISTERS
ITSA4A MOV R2,0E0S     ; SAVE END OF SCREEN LOCATION
      MOV R3,0N0ELIN   ; SAVE THE LENGTH OF A LINE
      MOV R4,0E0E      ; SAVE MAXIMUM DISPLAY INPUT SIZE
SETVDP MOV @R1+,R0     ; MOVE THE VALUE AT R1 TO R0 AND INCREMENT R1
      JEQ INIT2        ; IF IT WAS A ZERO THEN DONE
      SWPB R0          ; 1st MUST THE REGISTER 0 TO SET
      MOVB R0,@VDPWA    ; PUT REG. 0 TO VDP
      SWPB R0          ; GET THE VALUE
      MOVB R0,@VDPWA    ;
      JMP SETVDP        ; JUMP BACK TO DO NEXT REGISTER

;
INIT2 MOVB @COLOR+1,@>83D4 ; NOW PLACE A COPY OF YOUR COLOR HERE
;
      LI R0,>04FF       ; LOAD VALUE FOR KEYBOARD PASCAL SCAN MODE
      MOV R0,@>8374     ; MOVE THIS TO KEYBOARD DEVICE FOR KSCAN

;
; THE USER DEFINED INTERRUPT WILL BE USED TO CONTROL THE CURSOR
; BLINK RATE AND THE KEYBOARD AUTO REPEAT RATE.
; THE USER INTERRUPT IS EXECUTED EVERY 60th OF A SECOND WHEN INTERRUPTS ARE
; ENABLED. TO USE THIS PLACE THE ADDRESS OF THE PROGRAM YOU WHICH TO
; EXECUTE AT MEMORY LOCATION >83C4
      LI R0,TIMER       ; THIS IS THE START OF OUR TIMER ROUTINE
      MOV R0,@>83C4     ; ENABLE THIS ROUTINE

;
; TO MAKE VDP ACCESS AS FAST AS POSSIBLE WE WILL SETUP ITS REGISTERS
; TO CONTAIN THE NEEDED VDP POINTERS
;
      LWPI VDPWS        ; VDP WORKSPACE
      LI R0,VDPWA       ; SET R0 TO VDP WRITE ADDRESS
      LI R9,VDPWD       ; SET R9 TO VDP WRITE DATA
      LI R10,VDPDR      ; SET R10 TO VDP READ DATA
      LWPI MAINWS       ; SET BACK TO MAIN WS

;
; DEFINE THE CURSOR CHARACTER >0
;
      LI R0,>0000        ; START OF CHARACTER PATTERN TABLE
      LI R1,CURDEF
      LI R2,0
      BLWP @VMBW        ; CURSOR CHARACTER

;
      BL @CLS           ; GO CLEAR THE SCREEN AND RETURN
      CLR R6            ; R6 WILL CONTAIN THE CURRENT CURSOR POSITION
      B @MAIN           ; INITIALIZATION COMPLETE BEGIN THE PROGRAM

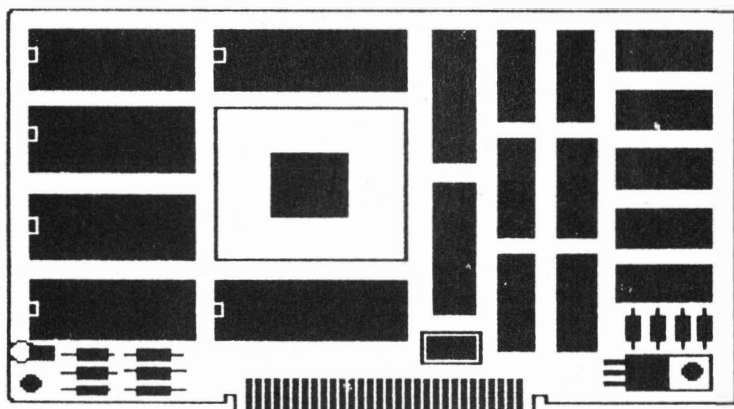
;
;
;*****Filename = MICRO-MAIN
;
; THIS WILL BE THE MAIN SECTION OF CODE FROM HERE
; WE WILL BRANCH OFF TO VARIOUS SUB-ROUTINES BUT
; ALWAYS RETURN HERE
;
MAIN BL @GETKY          ; GO GET A KEY AND RETURN WITH IT IN R1
; BEFORE THE CHARACTER CAN BE DISPLAYED IT MUST BE TEST FOR DISPLAY RANGE
      CB R4,@SPACE      ; TEST IF IT IS IN LESS THAN A SPACE
      JL CTLKEY         ; IF LESS THAN ITS A CTRL KEY
      CB R4,@HICHAR     ; HIGHEST DISPLAY CHARACTER IS A *** >7E
      JH FTNKEY         ; IF GREATER THAN ITS A FCTN KEY
      B @SHOW           ; GO SHOW THE CHARACTER AND ADVANCE THE CURSOR

;
CTLKEY LI R0,CTLTAB     ; START OF CONTROL KEY TABLE
KEYPRO SRL R4,7         ; NOW MAKE THE KEY VALUE A VECTOR INTO TABLE

```

(See Page 18)

McCann Software
presents
Avanti-99
forth card



Enter the world of today's technology with the Avanti-99 Forth Card available NOW from McCann Software. This amazing board plugs right in to your 99/4A or Geneve peripheral expansion box. The Avanti-99 allows you to get hands on experience with a new generation of very powerful processor the NC4016 from Novix. Since RAM memory prices have skyrocketed ~~300-400~~ percent, McCann Software will produce only the "top of the line" Avanti-99 for your best dollar value. This board has 100ns memory and 6 MHz clock yielding a blazing 7 MIPS (million instructions per second). The fast memory chips, high clock speed and advanced logic IC's we use to build the Avanti-99 give you the very best value in a new generation product. These boards come with 128K of data memory 32K of stack memory and 8K of DSR RAM memory.

Our version of cmForth is included both in 16K of on board EPROM and on disk in source code screens. We added a number of words like (VMBW and VMBR) to the December 1987 version of cmForth by Charles Moore (the inventor of Forth and the NC4016 chip) to make the language totally integrated into the 4A and Geneve environment. The Avanti-99 lets the experienced Forth programmer push the 4A into new levels of performance in graphics, music and speech which were previously limited by the current processors.

With purchase of the Avanti-99 you will get the SOURCE code for the operating system (4K compiled). And, the operating system (cmForth) can compile itself! This means you can modify it at will, in Forth. How many computers can you do that with today? Additionally, there are thousands of public domain programs written in Forth which you can port to the Avanti-99. And since the Avanti-99 runs the same NC4016 that is run in stand alone systems and PC boards you can develop software for those systems from your 99/4A or Geneve keyboard.

For a comparable board running on a PC or clone you would have to pay \$1295-\$1595 the Avanti-99 is yours for only \$595 which includes shipping and handling. To order send check or money order to address below. Allow 3-4 weeks for delivery (we assemble, test, number and sign each board individually.)

99/4A Software

The Printer's Apprentice	\$22.50
TPA Toolbox	\$22.50
TPA Fonts Disk 1	\$11.50
TPA Fonts Disk 2	\$11.50
Business Graphs 99	\$15.95

All above require 32K, Disk System and Editor Assembler or TI Extended BASIC. Prints on Epson compatible graphics printers including Gemini 10X, Panasonic 1091 or Star NX. Runs on TI-99/4A or Myarc Geneve 9640.

McCann Software
P.O. Box 34160
Omaha, NE 68134

This Page Produced Using
The Printer's Apprentice
& TPA Toolbox

ASSEMBLY—

(Continued from Page 16)

```

A    R4,R0          # ADD THE OFFSET TO THE TABLE START
MOV  R0,R0          # NOW GET THE SUB-ROUTINE ADDRESS FOR THIS KEY
B    R0             # GOTO THIS SUB-ROUTINE

#
FTNKEY CB R4, @MAXFTN # TEST FOR HIGHEST FUNCTION KEY ALLOWED
JH    IGNORE        # IF TOO HIGH IGNORE
CB    R4, @LOWFTN    # TEST IF BELOW VALID FUNCTION KEY RANGE
JL    IGNORE        # IF SO IGNORE
SB    @LOWFTN, R4     # SUBTRACT THE VALUE OF LOWEST FUNCTION KEY > 81
LI    R0, FTNTAB      # START OF FUNTION KEY VECTOR TABLE
JMP   KEYPRO         # GO PROCESS THE KEY

#
IGNORE B @MAIN      # ALL KEYS TO BE IGNORED COME HERE
#
##### Filename = MICRO-DISP
# ALL ROUTINES WHICH ARE FOR VDP ACCESS WILL BE DONE HERE
#
# THIS ROUTINE WILL CLEAR THE SCREEN FOR A 4A OR A 9640
#
CLS   MOV  @EOS, R2   # SET TO THE SIZE OF TEXT SCREEN
      CLR  R0         # SET TO START OF VDP
      LI  R1,         # USE A SPACE FILL CHARACTER
CLS1  BLWP @VSWB      # WRITE A CHARACTER
      INC  R0         # NEXT DISPLAY POSITION
      DEC  R2         # ALL CLEARED
      JNE  CLS1       # NO
      RT   # YES RETURN TO CALLER

#
# THIS ROUTINE WILL DISPLAY A CHAR. SAVE IT TO MEM. AND INCREMENT THE
# CURSOR POSITION AS WELL AS SHIFTING THE DISPLAY IF NEEDED

SHOW  MOV  R6, R0     # NOW DISPLAY IT
      MOV  R4, R1     # MOVE IT TO R1 FOR DISPLAY
      BLWP @VSWB      #
      B    @FOR       # NEXT CURSOR POSITION

#
# VDP MULTIPLE BYTE WRITE
VMBW  DATA VDPWS, VMBW0
VMBW0 MOV  R13, R0     # GET THE CALLERS R0
      ORI  R0, >4000    # INDICATE WRITE FOR VDP
      SWFB R0          # GET LOW ADDRESS
      MOV  R0, R8      # GIVE IT TO VDP
      SWFB R0          # GET HIGH ADDRESS
      MOV  R0, R8
      MOV  @2(R13), R1  # GET CALLERS R1
      MOV  @4(R13), R2  # GET CALLERS R2
VMBW1 MOV  R1+, R9     # COPY A BYTE TO VDP
      DEC  R2          # ALL COPIED
      JNE  VMBW1       # NO
      RTWP            # RETURN

#
# VDP SINGLE BYTE WRITE
VSWB  DATA VDPWS, VSWB1
VSWB1 MOV  R13, R0     # CALLERS R0
      ORI  R0, >4000    #
      SWFB R0          # GET LOW ADDRESS
      MOV  R0, R8      # GIVE IT TO VDP
      SWFB R0          # GET HIGH ADDRESS
      MOV  R0, R8
      MOV  @2(R13), R9  # WRITE THE BYTE IN CALLERS R1
      RTWP            # RETURN

#
# VDP SINGLE BYTE READ
VSB  DATA VDPWS, VSB0
VSB0 MOV  R13, R0      # CALLERS R0
      SWFB R0          # GET LOW ADDRESS
      MOV  R0, R8      # GIVE IT TO VDP

      SWFB R0          # GET HIGH ADDRESS
      MOV  R0, R8
      RTWP            # RETURN

#
# VDP MULTIPLE BYTE READ
VMBR  DATA VDPWS, VMBR0
VMBR0 MOV  R13, R0     # CALLERS R0
      SWFB R0          # GET LOW ADDRESS
      MOV  R0, R8      # GIVE IT TO VDP
      SWFB R0          # GET HIGH ADDRESS
      MOV  R0, R8
      MOV  @2(R13), R1  # GET CALLERS R1
      MOV  @4(R13), R2  # GET CALLERS R2
VMBR1 MOV  R10, R1+    # COPY A BYTE TO CALLERS REQUESTED CPU ADDRESS
      DEC  R2          # ALL COPIED
      JNE  VMBR1       # NO
      RTWP            # RETURN

#
##### Filename = MICRO-KEYS
# THIS FILE WILL CONTAIN ALL KEYBOARD HANDLING ROUTINES
#
# GETKY WILL CONTROL THE BLINK OF THE CURSOR AND REPEAT OF THE KEYS
GETKY MOV  R6, R0      # CURRENT CURSOR POSITION
      CLR  R3          # CURSOR STATUS FLAG
      LI  R1, 0        # LOAD CURSOR CHARACTER
      LI  R8, 15       # SET CURSOR TIME TO 1/4 SEC.
      BLWP @VSWB      # GET THE CURRENT CHARACTER
      MOV  R1, R2      # SAVE CHARACTER DISPLAYED
GETKY1 SWFB R1         # SAVE CURRENT CHARACTER
      BLWP @VSWB      # DISPLAY CURSOR/CHARACTER
      CLR  @CTIME      # RESET CURSOR TIMER
GETKY2 LIM1 2         # TURN ON INTERRUPTS
      LIM1 0          # TURN OFF INTERRUPTS
      BLWP @KSCAN     # GO SEE IF THERE IS A KEY PRESSED
      CB    @B375, @FF # ANY KEY PRESSED
      JNE  GOTKEY      # YES PROCESS IT
      MOV  @FF, @LSTKEY # RESET LAST KEY
      C    @CTIME, R8  # TIME TO SWITCH CURSOR
# CANNOT TEST THE TIMER FOR EQUAL SINCE IT IS INCREMENTED BY THE
# USER INTERRUPT TIMER AND MAY EXCEED THE SET VALUE
      JLE  GETKY2      # NOT YET
      INV  R3          # SWITCH CURSOR STATUS FLAG
      JMP  GETKY1      # CHANGE DISPLAY

#
GOTKEY MOV  @B375, R4  # SAVE THE KEY
      CB    R4, @LSTKEY # SAME KEY AS LAST TIME
      JNE  NEWKEY      # NO ITS A NEW KEY SO PROCESS IMMEDIATELY
      C    @RTIME, R9  # REPEAT TIMER UP YET?
      JLE  GETKY2      # NO SO IGNORE THE KEY
      LI  R9, 3        # SET REPEAT RATE FOR CONTINUED REPEAT
      JMP  NEWKY1       # CONTINUE
NEWKEY MOV  R4, @LSTKEY # MAKE THIS THE LAST KEY PRESSED
      LI  R9, 15       # SET REPEAT RATE FOR INITIAL REPEAT
NEWKY1 CLR  @RTIME     # RESET REPEAT TIMER
      MOV  R2, R1      # RESTORE THE ORIGINAL CHARACTER
      BLWP @VSWB      # DISPLAY IT
      RT              # RETURN

#
#SCAN  DATA KYBWS, KSCAN0
#SCAN0 LWPI >B3E0
      BL    @:000E
      LWPI KYBWS
      RTWP

#####
# USER INTERRUPT ROUTINE

```

(See Page 20)

MX01 Memory Enhancement System

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ASSEMBLY—

(Continued from Page 18)

```

# THIS SHOULD BE KEPT AS SHORT AS POSSIBLE SINCE
# IT IS PROCESSED EVERY 1/60 OF A SECOND
#####
TIMER INC @CTIME      # INCREMENT CURSOR TIMER
      INC @RTIME       # INCREMENT REPEAT TIMER
      RT              # RETURN
#
# WHEN PROCESSING THE ENTER KEY 1st WE WILL SCAN FROM THE START
# OF THE LINE FOR A CARRIAGE RETURN IF THERE IS NONE PRESENT
# AND IF WE ARE ON A SPACE CHARACTER NOW WE WILL WRITE A C/R
# OTHERWISE WILL DO TO THE START OF THE NEXT LINE
#
# TO CALCULATE THE SCREEN POSITION OF THE START OF LINE
# DIVIDE THE CURRENT SCREEN POSITION BY THE LENGTH OF A LINE
# THE QUOTIENT WILL THEN CONTAIN THE LINE NUMBER
# INCREMENT THIS BY ONE AND MULTIPLY THIS BY THE LINE LENGTH
# TO GET THE ABSOLUTE VDP BUFFER POSITION IF GREATER THAN THE DISPLAY
# SIZE ITS TIME TO SCROLL THE SCREEN
# DIVISION USES A 32 BIT DIVIDEND SO CLR R5 BEFORE THE DIVISION
#
ENTKEY MOV R6,R8      # GET CURRENT POSITION
      CLR R7          # CLEAR HIGH WORD
      DIV @ONELIN,R7  # DIVIDE THIS BY THE LINE LENGTH
# MULTIPLICATION PROVIDES A 32 BIT RESULT
# THE RESULT OF THIS WILL HAVE THE HIGH 16 BITS IN R7
# AND THE LOW 16 BITS IN R8. IN THIS CASE THERE WILL BE NO HIGH BITS
      MPY @ONELIN,R7  # THE RESULT IS IN R8
      MOV R8,R8      # START OF LINE
      MOV R8,R7      # SAVE THIS VALUE
      MOV @ONELIN,R2  # LENGTH TO SCAN
ENTKY1 BLWP @VSR      # LOOK FOR A C/R
      CB R1,@CR      # GOT ONE
      JEQ ENTXY2      # YES
      INC R8          #
      DEC R2          # DONE A FULL LINE
      JNE ENTXY1      # NO CONTINUE TEST
# NO C/R IS PRESENT ON LINE
      MOV R6,R8      # TEST IF A CHARACTER IS IN THIS POSITION
      BLWP @VSR      #
      CB R1,@SPACE    # IS IT A SPACE NOW
      JNE ENTXY2      # NO DON'T SHOW A C/R
      MOVB @CR,R1     # C/R CHARACTER
      BLWP @VSRW      # SHOW IT
ENTXY2 A @ONELIN,R7   # START OF NEXT LINE
      MOV R7,R6      # PLACE WHERE NEEDED
ENTXY3 C R6,@E0E      # TEST IF AT END OF ENTRY AREA

      JLT ENTXY4      # NOT THERE YET
      B @SCROLL       # GO SCROLL THE SCREEN
ENTXY4 B @MAIN        # DONE
#
SCROLL CLR R6          # FOR NOW JUST RESET TO TOP OF SCREEN
      B @MAIN        # THIS WILL BE ADDED LATER
#
#####
# SINCE WE ARE USING PAD FOR WORKSPACE REGISTERS
# IT IS GOOD PRACTICE TO CLEAR IT BEFORE WE LEAVE
# AS I HAVE HAD CASES WHERE RESULTS ARE THE SYSTEM WOULD
# LOCKUP WHEN RETURNING TO THE TITLE SCREEN
#####
QUIT LWPI >A000      # SET A WORKSPACE IN HIGH MEMORY
      LI R1,>8300      # START OF PAD
      PADLCR CLR #R1+  # CLEAR A WORK
      CI R1,>8400      # ALL OF PAD CLEARED
      JNE PADLCR      # NOT YET
      BLWP @0         # BYE
#
##### BACK SPACE #####
BACK MOV R6,R6        # AT THE START OF SCREEN NOW
      JEQ ENTXY4      # YES IGNORE
      DEC R6          # BACKUP DISPLAY
      JMP ENTXY4      # LEAVE
#
##### FORWARD SPACE #####
FOR INC R6            # NEXT POSITION
      JMP ENTXY3      # GO TEST FOR END OF SCREEN
#
##### UP #####
UP C R6,@ONELIN      # BEFORE YOU GO UP A LINE TEST IF ON TOP LINE
      JL ENTXY4        # IF SO IGNORE
      S @ONELIN,R6     # IF OK SUBTRACT THE VALUE OF 1 LINE
      JMP ENTXY4      # DONE
#
##### DOWN #####
DOWN A @ONELIN,R6    # NEXT LINE
      JMP ENTXY3      # TEST IF THIS IS PAST LINE 22
#
##### Filename = MICRO-END #####
SLAST
LAST DATA @
      END

```

Reader to Reader

Joseph F. Hunt, 513 AMS/Box 3596, APO NY 09127, wants some "very basic" step-by-step help in compiling a c99 program and then assembling it into object code. He also wants to know why his new Horizon RAMdisk locks up when he tries to use version 4.0 of Clint Pulley's c99 compiler.

Richard Bressler, P.O. Box 3706, Merced, CA 95344-3706, says he read in *Model Railroader*, March 1985 through August 1986 a way of interfacing a computer with a model railroad, but the 99/4A was not mentioned, and was wondering if anyone has succeeded in doing this.

L. Renda writes: "I have an original TI99/8 home computer and interface card for the 99/4A P-box called an Armadillo card. My problem is the card is complete except for the cable end

that plugs into 99/8. TI produced a couple hundred of these cards, some complete, some not. Any help with the cable end pin out or schematic would be nice. Call: L. Renda (216) 793-3684, 1762 Mahoning Ave., Youngstown, OH 44509."

Helmuth Dann of 820 Small Dr., Lake Worth, FL 33461, says he would like to locate someone in the West Palm Beach area who would initialize a box of disks for him. Dann says he has been unable to determine why his drive will do everything except format disks, and is running out of space on the ones he has.

Larry Apakiean, D.P.I., says a way to add 64K RAM to the internal part of the console for dynamic expansion was mentioned in *Computer Shopper's* "TI Forum." He wants to know if anyone has a copy of instruction for this prac-

tice. He also needs instructions for adding Extended BASIC directly through GROM in console without interfering with normal GROM functions. He also asks, "Anyone have ideas for expanding internal system to 256K dynamic RAM? Is there a way to expand the TI99/4A without the use of the P-box? Is there a substitute for the P-box?" Contact him at 2230 Forrester Ave., Holmes, PA 19043 or (215) 623-2835 or 532-3492.

Reader to Reader is a column designed to put readers in touch with each other. Anyone with a specific problem or question that may be answered by other readers is encouraged to submit an item. Be sure to address it to Reader to Reader, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

Geneve

Why fast copiers don't work

By **MIKE DODD**

Alan Fox asks why the fast disk copy programs (e.g. Rapid Copy, Turbo Copy, Rediskit) won't work on the Geneve. Explaining that requires an explanation of how the programs work.

The reason those type of programs work so quickly is that they directly access the lowest levels (the FDC chip) of the disk controller. Using the standard sector I/O routines, as most programs do, takes much longer. To directly access the FDC chip requires that the disk controller card be sitting directly on the computer's memory bus at address >4000. On the Geneve, this does not hold true — at >4000 is a page of RAM containing the MDOS DSR's. To page in the disk controller (or any card in the expansion box) requires loading execution page 2 with physical page >BA. You must also take care to save the page that was at execution page 2, and restore it when you are done directly accessing the peripheral. For example:

```
HBA  BYTE >BA
SVPG2 BYTE >00
```

```
*
```

```
MOVB @>8002,@SVPG2
MOVB @HBA,@>8002
```

```
*
```

```
* program accesses the bus peripheral directly
```

```
*
```

```
MOVB @SVPG2,@>8002
```

While page >BA is loaded, you must take care not to enable interrupts or perform a keyscan. Doing so could create a lockup.

That is the first part of the problem with the disk copy programs. That problem is easily fixed by the author of that particular problem. The second problem, however, is much more difficult to overcome.

On the CorComp and TI disk controller cards, there was a CRU bit that would enable "wait logic". This meant that the disk controller would force the 99/4A to stop processing while the controller was getting ready for a disk read or write. On the Geneve, this CRU line is not used — thus, the Geneve never stops. Correcting that problem involves massive rewrites of

sector I/O logic, and requires extensive knowledge of the architecture of the Geneve and the disk controller.

There is an author who is considering writing a fast disk copy program for the Geneve. The author has many of the subroutines already written, but has not decided whether such a venture would be worth the effort. The author does not wish to reveal his/her name at this time; however, any comments sent to me will be forwarded.

THE EXPLANATION

Last month, I presented a file encoder/decoder program. This month, I'll explain in more detail how the program actually works. This will be presented in outline form, with portions of the program referenced by line number.

0001-0077 Initialization of memory. This part of the program is run only once, when it is first loaded.

0001-0015 Misc. comments and equates. 0016 Forces this part of the program to load at >A000.

0017-0020 Save the old workspace pointer, so we can return later, and load our current workspace.

0021-0042 Scan memory to find every link to a DSK# device. Change the pointers to point back to our program, and save the old pointers.

0043-0045 Repoint keyscan addresses.

0046-0053 Move the main body of the program to the end of GROM 0.

0054-0056 Return to Editor/Assembler.

0057-0077 The subroutine to scan DSR memory for a specific device, save the link to that, and repoint to our program.

0078-0099 This portion is always resident. The various interceptions from DSR and keyscan links come here, which executes the main body of our program.

0079-0086 The four possible entry points, and set R1 to an offset into the execution table for that routine.

0087-0091 Load the GROM 0 page into >A000, and load page >03 into >C000 (this is so that sound will work). Execute our program.

0092-0094 Restore memory pages and return to the caller.

0095-0099 Misc. BYTE values.

0100-0106 Use R1 (see lines 0079-0086) to point into an execution table (TABADR), which will contain the address to the appropriate routine.

0107-0113 Saved addresses for the entry points of DSK1-7.

0114 Workspace buffer.

0115 Execution table (see lines 0100-0106).

0116-0118 Misc. DATA & BYTE values.

0119-0121 Code key buffer. The first byte is the length byte, followed by space for the text of the key. The portion of the program that reads the key places a space after it. This is because the CODER routine always uses two bytes at a time from the key — so if the user types in an odd number of bytes, there will be a consistent character for the last byte.

0122-0129 Misc. BYTE values.

0130-0208 Read keyboard for code keyword.

0130-0136 Any keyboard scan will come here first. The keyscan is then executed, returning to SCRT (line 138).

0137-0139 See if CTRL-F8 was pressed. If so, go to SCHOT (line 145), otherwise, to SCRT1 (line 141).

0140-0143 Return to caller.

0144-0155 Make a long middle C sound.

0158-0188 Scan the keyboard and store keycodes in CODE.

0158-0162 Execute the keyscan routine.

0163-0165 See if any key preseed. If not, go to line 158.

0166-0172 Check key. If ENTER, then go to SCH2 (line 191). If a function or control key, then go back to SCHOT (line 145), which has the effect of erasing the code key buffer and starting over.

0173 Store keycode in buffer.

0174-0185 Make a short middle C sound.

0186-0188 See if maximum length has been reached. If not, continue allowing key entries.

0189-0208 ENTER has been pressed, or maximum length reached.

0189-0191 Store space as final character.

0192-0202 Make a medium-length high

(See Page 26)

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This great piece of programming actually simulates and plays the famous board game. For legal reasons we cannot name the game but "do not pass Go! but go directly to Jail!"
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Play Poker against your TI-99/4A. When you win a hand she loses--a piece of her clothes that is. Don't worry about being a lousy poker player. Another file is included where you don't even have to know an ace from a king.
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SERIES I (CONT.)

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This program allows you to print out the material from your printer sideways. Great for spreadsheets, banners and large graphics. Second side contains some new enhancements for Multiplan not available on the TI upgrade.

#17. TI FORTH DEMO DISK

This demo disk was released by TI to show the power of Forth. Fantastic music and graphics. Ed/Assem & 32K required!

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This program loads into the Mini-Memory module and checks out your entire system. Much better than disk based diagnostics that cannot be used if a problem in the disk system is at fault. Complete documentation on second side.

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SERIES II

#21. DATA BASE DEMO DISK

A professional data base program that was originally written to store various magazine articles from computer magazines and then find them by name, subject, key word, or publication. Fast, easy to use and easy to adopt for other applications. Comes complete with sample data to make learning data base processing easy. Completely menu driven and unprotected.

#22. ASTROLOGY DEMO DISK

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#23. WILL WRITER DEMO DISK

Enter your answers to a group of computer asked questions and this program then writes you a last will and testament. Now you can leave your TI-99/4A to your favorite nephew. Works with any printer. Appears legal in all states but better check that out!

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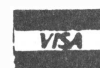
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#30 HOUSEHOLD BUDGET PRINTOUT
With this disk you print out the data you have stored with the TI HBM Module. HBM is a great module that can be used for many home and small business applications but TI forgot to include a printout function. This program comes with full instructions and we are sure that your HBM Module will now start being used. Fantastic programming job.

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This disk has every thing you need to learn and practice Morse code for the various FCC license exams. It also is great for scout groups and school "ham" clubs for group training and merit badge qualification. Professional quality.

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Two disk sides full of high quality xmas music that can be played throughout the holiday season and then used as a learning tool since it contains wonderful arrangements and graphics. Autoloading and menu driven.

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Another collection of classic games for the TI-99/4A. Exbasic & 32K req.

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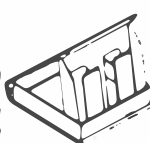
Still more of the great ones from all over the world. The quality, graphics and speed of many of these games will make you wonder why they were never released commercially

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#40. ARTIFICIAL INTELLIGENCE DEMO

This disk contains the famous computer program "Eliza" where you type in a question or a problem you are having and "Eliza" helps you find the solution. Also contains one of the better biorhythm programs so you can analyze all your emotional problems at one sitting

#41. VIDEO GRAPHS MODULE BACKUP DISK

This disk is a backup of the discontinued Video Graphs Module from TI. For legal reasons, it can only be purchased for backup use by owners of the original module. Do not order UNLESS you have the original module and intend to use this disk only for backup purposes. Exbasic autoload...

#42. FUNNELWEB FARM UTILITY

You heard about this one, now direct from Australia is the latest version of this fantastic utility that puts everything at your command. From one program you can access word processing, editor assembler, telecommunications and just about everything else. A freeware program complete with documentation on a second disk side.

SERIES IV



TI PROGRAMS FROM AROUND THE WORLD

#43. BEST OF BRITAIN, VOL I.

Now for the first time, a collection of the best 99/4A games Britain has to offer including the famous "Billy Ball" series of arcade games. Great graphics, action and excitement.

#45. BEST OF BRITAIN, VOL II.

This disk contains an outstanding 3-D graphics adventure game for the TI-99/4A. Carfax Abbey lets you actually move through a four story mansion complete with bats and vampires. You actually are placed in each room and go up and down stairs and through secret panels. Legend of Zelda...look out!

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A great trivia game for 1 to 4 players with great questions and capability to add your own and print out the files. This one is a real challenge.

#47. INFOCOM RAPID LOADER

If you have Infocom games this is for you. Loads all TI Infocom games in only 28 seconds and permits new screen colors and improved text display. Comes with all documentation on disk.

#48. GHOSTMAN (from England)

This Pacman/Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

#49. DEMON DESTROYER (from France)

This great assembly game starts where Invaders leaves off. Add features like descending aliens and closing walls. Hours of great arcade action.

#50. OH MUMMY (from Germany)

Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

#51. BERLIN WALL (from Canada)

This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

#52. ANIMATION 99 (from Germany)

THIS IS THE ONE!!!. A demo disk filled with fantastic computer animation routines like you have never seen before on any computer. See famous cartoon figures move with more realism than on Sat. morning tv. This disk received a standing ovation when previewed at a local users group. We have even included instructions how to do it yourself on the second disk side. This one is a show stopper!!!

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#53. HACKER/CRACKER

A collection of disk copying programs that copy TI disks by tracks. If one of these can't copy a protected disk nothing will. We included a collection of the very best ones including both TI and CorComp compatible. These programs require 2 disk drives and 32K of memory.

#54. ASTRONOMY DEMO

This program from Australia plots the heavens and teaches you about the solar system. A great learning and reference tool. Exbasic and 32K required. Don't confuse this one with our Astrology Demo. They are not the same..ask Nancy!

#55. SCREEN DUMP

This program allows you to dump disk and even module programs to a Star/Epson compatible printer. Comes with easy to follow plans to build a load interrupt switch which is needed to dump module programs. This dump program by Danny Michael is considered the best of the bunch!. Complete with documentation.

#56. SPREAD SHEET DEMO

OK, its not Multiplan but it works great and handles many spread sheet applications. A great way to learn to use spread sheet software. Comes with full instructions and documentation.

SERIES V

#57. TELCO

Considered one of the best data communications programs for the TI-99/4A. Complete with documentation.

#58. PR BASE

The alltime most popular and widely used data base program for the TI-99/4A. A freeware program that is widely supported and updated.

#69. COMPUTER PLAYER PIANO/ KEYBOARD CHORD ANALYSIS

A unique music program which displays a piano on the screen and actually plays your selections.

#59. GRAPH MAKER

A collection of the best programs for producing graphs and charts from your data. Exbasic and printer

#60. FREDDY

A fantastic game where you guide the hero through underground passages filled with danger. Nintendo quality, great graphics and fast action. One of the best we have ever seen!!!

#61. THE MINE

A fast action game from F.R.G. that will keep you going for hours. Many screens and skills required.

#62. DISK MANAGER II MODULE BACKUP

The complete TI Disk Manager II on Disk. For legal reasons it is only available to owners of the original module for backup use.

#63. ASTROBLITZ/MAZOG

A pair of great games that continue where Parsec and Munchman leave off. Imagine Parsec with enemy space craft coming from in front and in back of your ship!!!

#64. MAJOR TOM/SPACE STATION PHETA

A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great

#65. PERFECT PUSH

An all new space game where you assemble and launch a rocket ship in outer space while avoiding a space monster. This one is Professional in every way..graphics, speed and action!!!

#66. HEBREW TYPEWRITER

This program converts your TI-99/4A keyboard into a typewriter that displays Hebrew letters on the screen. Can also be printed out when used in conjunction with a screen dump program. Great for religious training or making your own copy of the dead sea scrolls or ten commandments!

#67. GENEALOGY DISK

Now you can set up your family tree and store or print out the records. Great for keeping track of family relationships and records.

#68. CHESS

The original computer chess game Zargon has been reprogrammed for the TI-99/4A. Now play chess with your computer. Documentation included. Exbasic autoloader.



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GENEVE—

(Continued from Page 21)

C sound.

0203-0208 Store length in CODE, set key value to >FF, and key status to indicate a key has been pressed. Otherwise, the program you are returning to could read the Enter key on an auto-repeat.

0209-0235 DSR entry point.

0209-0219 Determine what drive has been called for, use that to find the link address for that DSR.

0220-0221 If coding is disabled, continue executing the DSR without further action.

0222-0235 Read the opcode of the PAB. If read or write, go to DSR1 (line 240). Otherwise, drop through to DSRRT (line 237).

0236-0238 Return to the DSR or caller.

0239-0261 Code/decode the record.

0239-0248 Determine the buffer address and save the return address. If a write opcode, go to DSR3 (line 259), otherwise, fall through to line 250.

0249-0257 DSR read.

0249-0252 Execute the read opcode.

0253-0257 Decode the record and return to the caller.

0258-0261 DSR write. Code the record and continue with DSR.

0262-0320 CODER subroutine.

0262-0277 Get length of string to operate on. If string in CPU, go to COD03 (line 0302), otherwise, fall through to line 278.

0278-0300 Operate on VDP string.

0278-0281 Initialization.

0282-0286 Get two characters to code.

0287-0288 Code the two characters with an XOR.

0289-0296 Write the two characters back to VDP. After each one, check the length — if done with record, go to CODRT (line 0319) to return.

0297-0300 Roll code key pointer back to start if needed, and continue coding string.

0301-0318 Operate on CPU string.

0319-0320 Return from CODER to caller.

0321-0330 Set VDP write and read address.

0331-0333 End of program.

USE THE CORRECT SOCKET

Garry Christensen of Australia passes this information on:

“Myarc sent out a Geneve some time ago. I sent this unit around the other Users’ Groups in Australia so that they could get the feel of the new computer. When it

came back, the keyboard would not work.”

“A bit of quick detective work showed that the clock line was held low. It turned out that the tri-state buffer chip in the keyboard was the culprit.”

“I wondered why, so I checked the pin-outs for both sockets. The 5-pin keyboard plug will fit into the 8-pin video (socket, which causes)...12V (to be)...put onto the clock input for the keyboard.”

“The moral of this story is to be very certain that the keyboard plug is in the correct socket before powering up.”

One additional note on this point: last year, I inadvertently reversed the keyboard and video plugs on my Geneve, and powered up the system. It did not have any ill effects on my computer or keyboard. However, it could be that only certain keyboards are affected or that it requires that the computer be on for a certain amount of time before the damage is permanently done.

Readers with questions or suggestions about the Geneve may write Dodd at 116 Richards Dr., Oliver Springs, TN 37840. Although a personal response may be not possible, items submitted may be addressed in future columns.

McCann releases Avanti-99 Forth Card

McCann Software is now producing the Avanti-99 Forth Card.

According to the manufacturer, the card plugs into the peripheral expansion system box of either the 99/4A or Geneve. Selectable CRU base address allows one or more Avanti-99 cards to be installed. One card runs at 6 Mhz using 100ns static RAMs and uses ALS and HCT logic chips for low power consumption and high speed operation, the manufacturer says.

The product is listed as having 128K of data memory, 32K of stack memory, 16K of EPROM memory and 8K of battery-backed DSR RAM memory. Interface software loads from the Editor/Assembler-Forth environment, the manufacturer says.

According to the manufacturer, the card's speed of 7 MIPS (million instructions per second) is delivered by the Novix NC4016 microprocessor. This 121-pin

PGA contains the basic architecture of the Forth language in silicon, in which the stack operations directly executed allow the high speed. The manufacturer notes that recent benchmarks published in a *BYTE* magazine letter to the editor show the NC4016 outperforming the 80386 and 68020.

Though the board runs in the 4A environment, McCann says it has preserved the operating system (cmForth by Charles Moore, the inventor of Forth and the NC4016) similar to the way it runs on Moore's December 1987 FK4 system, while adding some familiar 4A forth words such as VMBW and VMBR. An experienced Forth programmer, McCann says, will be able to develop software for any NC4016 system whether on a PC, standalone or microcontroller environment from a 4A or Geneve keyboard. The man-

ufacturer says the Forth programmer can also port much of the public domain Forth software into the Avanti-99 environment. The concept of “shadow ROM” has been used in the Avanti-99 design. This means that once the Avanti-99 boots up from the EPROM on board, the operating system copies itself to RAM and turns the EPROM off, if the user desires. This allows the programmer to reclaim all the addressable space. The operating system, both cmForth and the 99/4A side of the operating system, is provided in source code so the user to examine or modify the Forth software architecture; cmForth can modify itself allowing the user to modify or rewrite the operating system and test in on the Avanti-99.

The card sells for \$595 including shipping and handling from McCann Software, P.O. Box 34160, Omaha, NE 68134.

Animation with the Comic Show Editor

By RAY KAZMER

With Gumby, Mister Bill or more recently, Paddington Bear, on TV, small figurines are moved, very slightly, by hand, then photographed, on a single "frame" of film, using a movie camera. The process is repeated, over and over, and when the film is run, the figures appear to move. This is called "stop-motion photography."

The best example I've ever seen was the mine-car chase in "Indiana Jones and the Temple of Doom." But stop-motion isn't true animation. True animation consists of drawn pictures.

Now that you know the difference, you can create high-speed, full screen, PC-style animation with your 99/4A.

A LITTLE HISTORY

Thousands of years ago, a caveman took mankind's first shot at creating an animated picture. It was an antelope, with what looks like eight legs. If you consider the materials he had to work with and the rather limited number of art schools available at the time, it was an incredible masterpiece. It's just too bad that he never signed it.

The process of animation was ignored for many thousands of years, but in the mid-1800s, a Frenchman, Louis Daguerre, invented photography (more or less) which he did remember to sign. Soon after that, his "daguerrotypes" led to nickelodeons, popcorn machines, indoor plumbing (for darkrooms) and deep-space color shots of Earth, all of which we now take for granted.

In the late 1800s (years before Walter Elias Disney was born) a Russian immigrant drew the first animated flip book. He had no money and couldn't afford toys for his son, so he drew these things (with pen and ink) to keep his son amused and off the streets. His first flip book featured a silhouetted figure of a lady (in a bustle)

ice-skating. Then, came Disney.

Before World War II, Disney cartoons begat comic books, which begat big little books. These were chunky little items, half text and half pictures. Some of them devoted one corner of each "picture page" to animated drawings, which would appear to move as you flipped their pages. My flip book (see accompanying article) works the same way, only with fewer drawings.

The articles on these pages and the review of Artist Enlarger that follows comprise a 'how-to' manual for the budding computer animator.

Soon after World War II, when I was just a kid in grade school, somebody came up with a million dollar idea which would sell tons of bubble-gum — baseball trading cards. Each card had a terrible color picture of our favorite "sultan of swat" on one side and his vital stats on the other. Would you believe that a few of those cards, for which we paid one nickel (which included three equally awful planks of pink gum) are now selling for thousands of dollars!

FAVORITE FLIP BOOKS

The idea of including some sort of a prize with that yucky gum wasn't a new one. Just before baseball heroes took over, the "cavity peddlers" were enclosing a "part" from a flip book. Each part contained four numbered pictures, which you had to carefully cut apart, then put into sequence, once you spent all your U.S. Savings Bonds money on their gum. (Well, after all, the war was over.)

As I recall, each flip book had about 28

photographs in it and you could never find the last four picture panels of most of them, to complete a book (which was why we bought so much gum.)

These flip books, each about the size of an open matchbook, were made with movie film strips (a photographic process) so, they were not true animation either. I distinctly remember some of them.

One was "Boy," Tarzan's movie son, tying a knot in a vine. Another was an unknown magician, who made a few "mystical motions" over a hat, then pulled out a ... (I don't know what he pulled out. I never got those last four pictures.) My favorite (I did complete this one) was of an old car, crashing into the pumps of some ancient gas station, after which everything blew up. This "scene" was used in many of the cliff-hanger, serial shorts we paid a dime to see on Saturday matinees.

For a while, my sister, my brother and I also had to eat a lot of Cheerios, because they had great cartoon character flip books (Daffy Duck, Tom & Jerry, etc.) all in full, all for only a few box tops.

COMIC SHOW EDITOR

Today, we've reached another memorable plateau in animation history with the advent of the Comic Show Editor, written by Thomas Opheys of West Germany, whose name will be entered in my personal "Hall of Famous Animators."

But don't get all excited prematurely. Opheys' Comic Show Editor will not draw your pictures for you. That must still be done the old-fashioned way, by hand, with TI-ARTIST. So, what does CSD do?

Basically, it takes a group of TI-ARTIST pictures, squashes them (something like Barry Boone's Archiver) then creates an "image format" group of assembly files, which will run from outside the CSD environment, in a stand-alone comic show.

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ANIMATION—

(Continued from Page 27)

So far, I have seen two totally different versions of his editor.

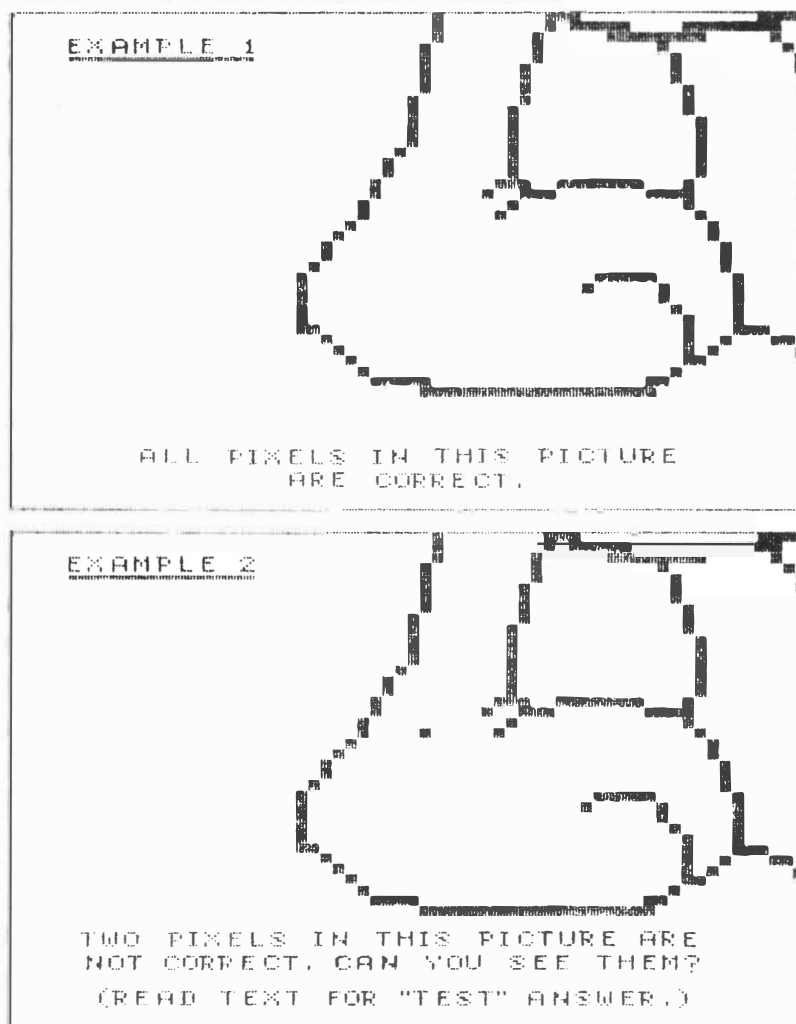
The first version was entirely in German, including the docs. Thanks to J. Fredericks and Ken Gilliland, the documentation was translated. I was then able to translate the program itself, once I knew what the commands meant. This version allows the "display speed" of the animation to be increased or decreased, by pressing the "-" or "+" keys and you can also "preview" your comic show prior to completing the creation process, a handy feature for "flasher" hunting.

The newest Comic Show Editor (Ver. 4) puts total control in the hands of the programmer (no "+" and "-" to press) but programmers can "build in" delays between frames, add foreground and background colors (within limitations) and use a TI-Writer log file (a "control file") which it reads and then creates a comic show according to those "commands." If you put a lot of pictures into your comic show, this feature can save a bunch of typing. There are advantages and disadvantages to each version, and they are different. I hope another version will make an appearance soon with the best parts of both versions. The use of color by the Comic Show Editor (and TI-ARTIST, for that matter) are, in my humble opinion, not yet perfected.

Wait a minute! No fair using a buzzword like "flasher" and then not including an explanation. A flasher, in CSD jargon, is a single pixel, which is either on when it should be off, or vice versa. These vicious little dots invariably creep into your comic shows and literally "steal the show" by pulling your eyes away from the animation. Hunting them down and "rubbing them out" is the hard part. The rest (believe it or not) is fairly simple, even if you have little or no artistic talent.

I've devised a little test for you. Compare the two examples of Odie's foot. One flasher is quite evident (on his ankle) but can you spot the second one? If you can find the second flasher, before I tell you where it is, you are probably a natural animator and you could create your own comic show, with only minor amounts of cussing.

You'll need a starting point, one TI-



ARTIST "-P" picture. Your RLE (Run Length Encoded) library is a great place to look. Try to select a less elaborate, simpler line drawing for your first attempt, unless you have some heavy-duty, masochistic tendencies

WHAT TO DRAW

Children's coloring books or Sunday funnies are also sources for potential material, if you've mastered my waxpaper digitizer technique. Briefly stated, tape a piece of waxpaper over the cartoon you wish to copy. Trace all lines into the waxpaper surface with a sharp pencil, or pointed stick. Tape the waxpaper to your TV/monitor screen. Load TI-ARTIST. Place "dots" (as close together as possible) under the waxpaper's lines. Remove the waxpaper, then play "connect the dots," in the zoom mode. You should then have a fairly reasonable copy. (Save the mess.)

Most images "digitized" from Sunday funnies will be quite small. With this in mind, make sure you read my review of Artist Enlarger in this issue.

'A BREEZE'

Computerized animation is a breeze, compared to making a TV cartoon. There, each frame must be drawn from scratch, but we 99ers can make multiple copies of one frame (which I call "base frames"), name each differently, then redraw only those portions of each, where "movement" occurs. That is the whole secret in a nutshell.

After selecting, digitizing, or just plain drawing your first frame, you must use TI-ARTIST to make base frames, as many as you think you'll need. (I used six, which was just right, via my "lucky-guess process.") Most important: As you make your base copies, put each new filename into

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ANIMATION—

(Continued from Page 28)

each picture, so it can be read on your screen when any given frame is loaded by TI-ARTIST. (The identifying filenames can be erased later, after you complete your show.) Though this will take extra time and trouble at the outset, it could save you from overwriting one frame with another and ruining lots of work. Check my "Garfield 1" example. See the number?

It's a good idea to plan your "moves" in advance, so before you make your first change, I suggest you print a hard-copy of your first frame, right in the center of a sheet of paper. In the large white area around the picture, write notes of what you want to move in the picture, its "speed," etc. Movements that change radically in each frame will move fast when your comic show is run. Objects that should move slower require more drawings.

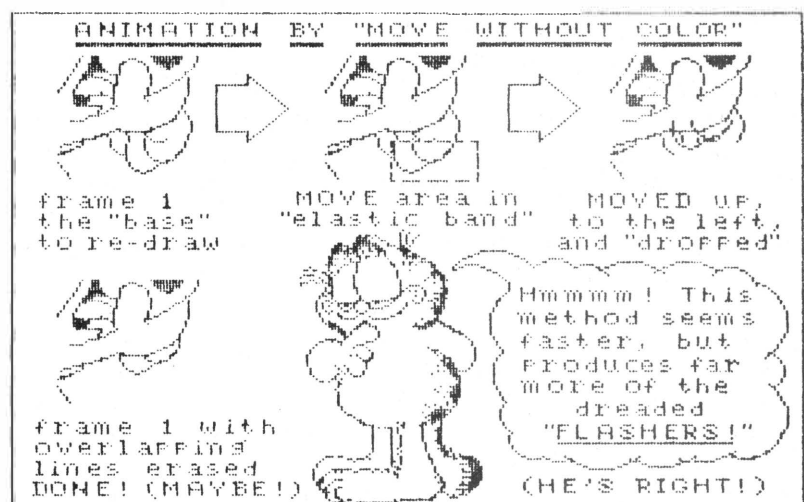
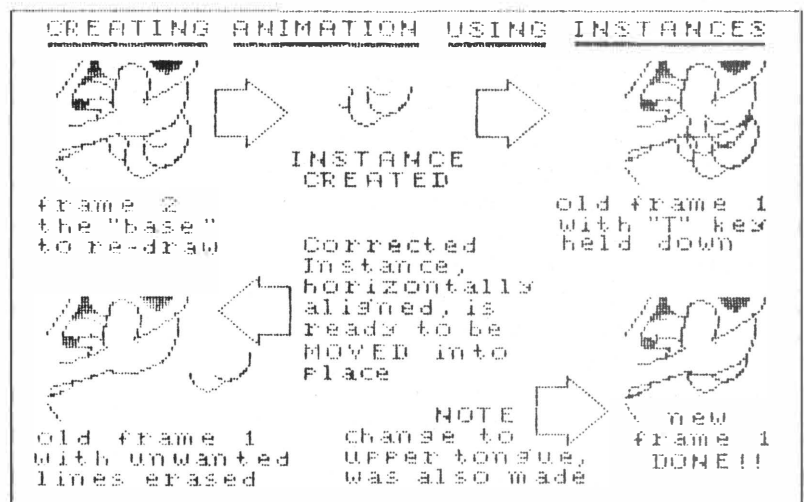
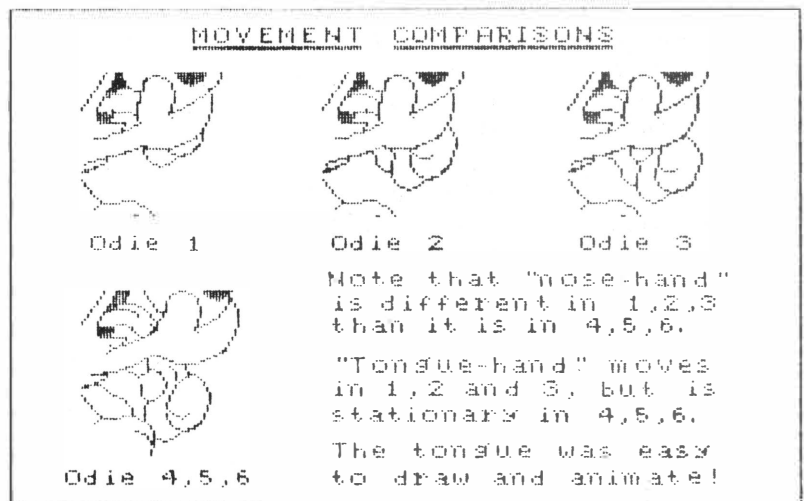
As an example of "speed," take a peek at Odie's tail (fast movement) and Odie's "tongue-hand" (slower movement) in the flip book pages, elsewhere in this issue.

When I started animating my waxpaper digitizer picture of Garfield and Odie, I found that that picture (drawn years ago) had to be the sixth (or last) frame in the series. Since it was the first one drawn, I had to work backwards, from No. 6 to No. 1. Remember that while studying my Creating Animation Using Instances, and Animation by Move Without Color. These examples will show you two different ways to animate portions of frames. If you try animation, you will no doubt find even more nifty ways to do it.

Use the "T" key (in Enhancements) to check the placement of a piece on your target area. If it looks about right to you, you can either drop the piece or temporarily move it off target, as shown in my graphic examples, to work on it, which I call "just parking."

If you use the just parking method, always park in straight alignment (either horizontally or vertically) with (and as close as possible to) your target area. After erasing some of the unwanted lines, you simply pick up the piece, slide it straight over to your target area and test it with the "T" key again. With TI-ARTIST, it's not as hard as it sounds.

You can also use Copy Without Color to create the same effect, as shown in my



Creating Animation Using Instances.

A FEW TIPS

Here are a few tips: Save your changes frequently. Always check the filename (cleverly installed in each frame) before saving, then save it on two disks. Extra copies may prove to be real life-savers.

Animation techniques are relative things, with no right and no wrong (unless you leave flashers in). Everybody does it a little differently than somebody else, but the payoff can be gratifying if you stick with it, especially when your first creation

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ANIMATION—

(Continued from Page 29)

"comes to life."

A few years ago, RLEs were all the rage. Everybody I know has at least a few RLEs in his or her personal library. Now, Mr. Opheys has given us two super programs to make them move (and you ain't seen nuthin' until you've seen a comic show in action).

You can get "running" examples of animation from a few places. Asgard has a "dinosaur disk" (Instances and several animated pieces) by Ken Gilliland. Ken's artwork is always super.

Tex-Comp is carrying the first (my English translation) version of the Comic Show Editor. They may also have Ver. 4 by the time this article gets into print. Some sample animation pieces are on this "demo disk," all menu-loading. (I know, because I put them there, along with Garfield, my on-screen version of my flip book.)

You can also send some fairware contributions, (or a few disks of your stuff) to the author of the original Comic Show Editor: Thomas Opheys, Margrafenstr. 16, D-4100, Duisburg 11, West Germany.

At this writing, I don't know if he has



an English version, or a newer version of his Comic Show Editor (which is Fairware) but wouldn't it be great fun to try to find out? Remember, U.S. postage stamps are of no use to someone in Germany, so in lieu of postage, please kick in an extra buck or two, especially if you request an airmail return. (*You can buy international reply coupons at the post office which someone in another country can turn in at the post office there for currency or stamps —Ed.*) Supporting Fairware

authors makes programs like this possible.

Lest I forget, where is that second flasher? Put your finger on the flasher on Odie's ankle. Now, bring it straight down, all the way to the sole of his foot. Look at the spot where the two bottom lines meet, right where you're pointing. Check this spot in the "correct" picture. See the difference? Yes. That is a flasher, but this one is off, when it should be on. The flasher on his ankle is on when it should be off. (Whataya mean, I cheated!)

Build your own comic flip book

By RAY KAZMER

Comic Flip Books have been around for quite awhile (see my article on the Comic Show Editor.) Now, a new twist has been added, getting your 99/4A to produce them!

COPYING

Make eight photocopies each of the six "pages" I've drawn for you. Standard photocopy paper is usually too thin to "riffle" properly (like a deck of cards) and that's what produces the "illusion of movement," so if you can get them copied on heavier gauge paper stock, by all means do so.

CUTTING

Look at page number one. Note the "box" on the left side of the picture, where the "staple line" is drawn and the page number is displayed. This box is a part of each picture. It *must* be left attached when you cut out the pages. Trim each subsequent page, exactly the same way. If you trim the first page on the lines, then all other pages also should be cut, exactly on the lines. (A sharp paper-cutter is preferred over a pair of scissors.) However, you do it, take your time. The more precise you are with cutting, the better. (See Page 31)

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Dallas, TX 75230

Also ask about TI RS232 and Disk Controller upgrade kits.

(Super Extended BASIC is a trademark of Triton Products Company)

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classifieds to sell
unwanted items**

FLIPBOOK—

(Continued from Page 30)

ter your flip book will “move” when it’s finished.

Two edge lines on each page, will be used for “alignment” purposes. Use extra care to cut along these lines, or your cartoon will jump around when flipped. The right edge line is most critical. The top or the bottom edge line (your choice) will be your next most critical cut. If you decide to align with the top line on the first page, then the top line must be used to align all subsequent pages.

As each page is cut out, place them in their own stacks, ie; all number 1s in one stack, number 2s in another, and so on. Be careful not to bend corners.

Making lots of little cuts can be a tedious job! If you catch yourself getting impatient or trying to hurry it up, then stop, set everything aside for awhile, and continue it later.

I made that mistake with my first attempt and had to get everything photocopied again.

SEQUENCING AND CHECKING

Now we’ll put this thing together. For a good fluid motion, the pages must be arranged in the following sequence:

1—2—3—4—5—6—5—4—3—2—1—2—3 and so on, until all the pages have been used. Notice that you do not go back to 1 after you reach page 6. You must retrace your steps, back and forth though the pages. As a result, you will have a few page 1s and 6s left over at the end, but save those spares. You may need them to replace tattered 1s and 6s, after your flip book has seen a few rough miles.

It’s very easy to lose track of page numbers and get something out of place, so check to be sure the sequence is percent correct and all pages are rightside up. (Really!) Then check to see if your “book” fits easily into your staple-gun. Since paper thickness will vary, it would be helpful to know if a standard stapler can be used or if an industrial type is required, before doing a final alignment.

ALIGNMENT AND BINDING

The last step sounds easy but can be tricky, if not done slowly and carefully.

Using a flat, smooth surface, such as a table-top, you must tamp down your stack of pages, like you would a deck of cards after shuffling. But tamp them down only on the two “alignment sides.” You’ll find it’s a lot harder to tamp down these smaller pieces of paper, than it is to tamp a deck of playing cards.

The last tamping should be done on the right edge of the pictures. This is where your fingers will be riffing, to create the motion so this edge must be as even as you can possibly get it.

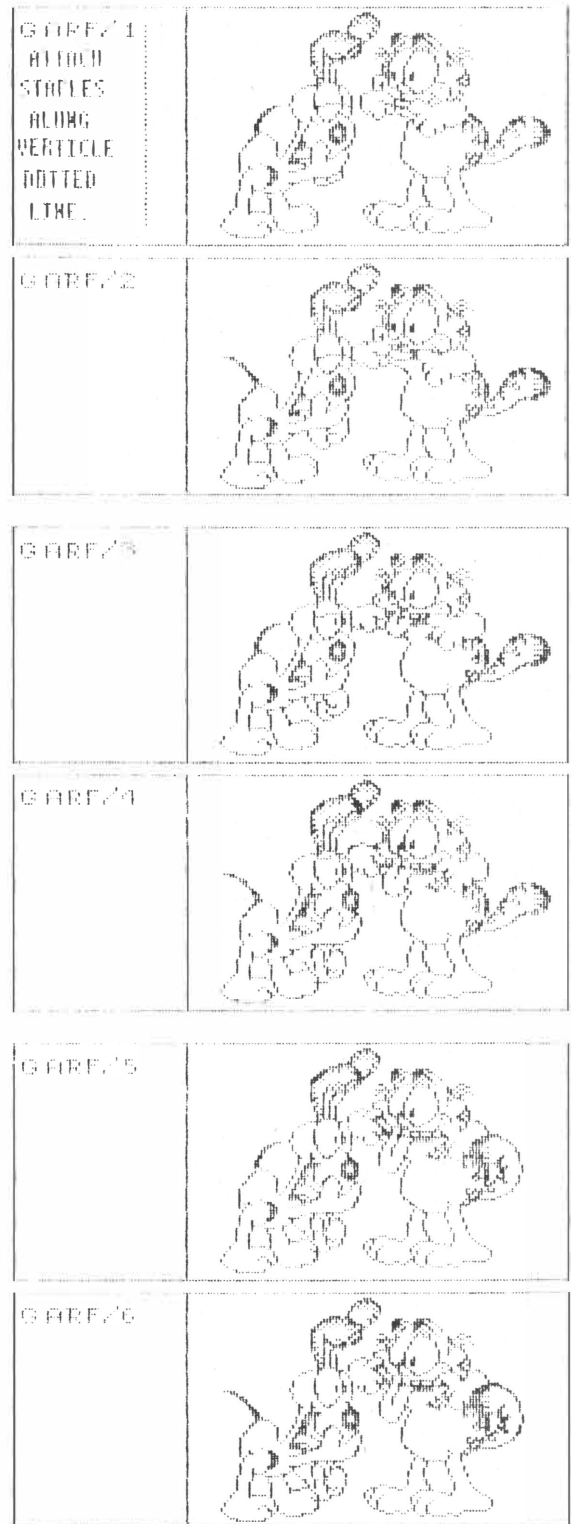
Firmly grip your book (by the face and back) and visually check to see if everything looks even. Do not “feel” the edges, as this sometimes slides a page out of alignment.

If everything looks okay to you, carefully insert the tab end (left side) of the stack into your stapler and place two staples near each end of the staple line. Be sure they go all the way through on your first attempt.

After placing the first two staples, pop a few more into the tab end, but to the left of the staple line, and at odd angles, just to keep everything “solid.” To protect young fingers from scratches by sharp staples, you can wrap a strip of black (rubberized) electrical tape around the tab end, to cover the staples.

TO USE

Bend your new flip book back slightly. You’ll notice the right edge fans out a bit. Run your fingernail down over this edge and watch the pictures move. Egads!



IN CASE OF PROBLEMS

The print in MICROpendium is of a high quality; however, it’s still ink on paper, which can be smudged by handling. If you want a free copy of my original flip book files, which can be printed by TI-ARTIST (See Page 32)

Artist Enlarger

Reduce or enlarge pictures and fonts

By RAY KAZMER

The author of Artist Enlarger, Howard Uman, is 17. He just graduated from high school, and is a friend of mine. I call him "The TI Wizard of Randallstown, Maryland."

When I first considered writing this review, I warned him, that if I thought his program sucked, I would say so, and not allow our friendship to influence my judgment. I would "pull no punches!"

He sent me a copy of Artist Enlarger with a short, but confident note: "Write the review!"

First, I'll point out that there was no documentation with the copy I received, but Artist Enlarger is so easy to use that I didn't need docs. (But how do I grade the documentation?) Well, I'll just leave that spot blank on the report card. (A three-page manual gives instructions on running the program and diagrams showing what happens when a font or picture is enlarged, reduced, stretched or squeezed, according to Chris Bobbitt, president of Asgard.

—Ed.)

The main menu has 4 key-presses: 1-FOR INSTANCES, 2-FOR FONTS, 3-CATALOG, and 0-TO EXIT. The disk catalog searches only for Instances (—I) and Fonts (—F).

This feature prevents eye-strain by showing only the files it uses. A nice touch.

At first glance, the program seemed to go to the same "input filename" screen, whether I picked 1 or 2, but not so. The program includes the "—F" and/or the

Review

Report Card

PerformanceA+
Ease of Use..... A+
Documentation NA
ValueA+
Final Grade.....A+

Cost: \$9.95

Manufacturer: Asgard Software, P.O. Box 10306, Rockville, MD. 20850

Requirements: Console, Extended BASIC, TI-ARTIST

"—I" after the filename for a user! (A very convenient feature.) I have written a few TI-ARTIST fonts and remembering to add an "—F" onto files I was manipulating, with TI-Writer, was something I frequently forgot.

But what would happen if I input a non-existent filename? (I tried my best to make Artist Enlarger fail.) My screen (usually white on dark blue) suddenly changed to white on dark red and listed there, was what seemed to be every possible error a user could cause, like a "checklist," but in plain English. (None of those nebulous "I/O ERROR" numbers.) You also get suggestions, on how to correct each error.

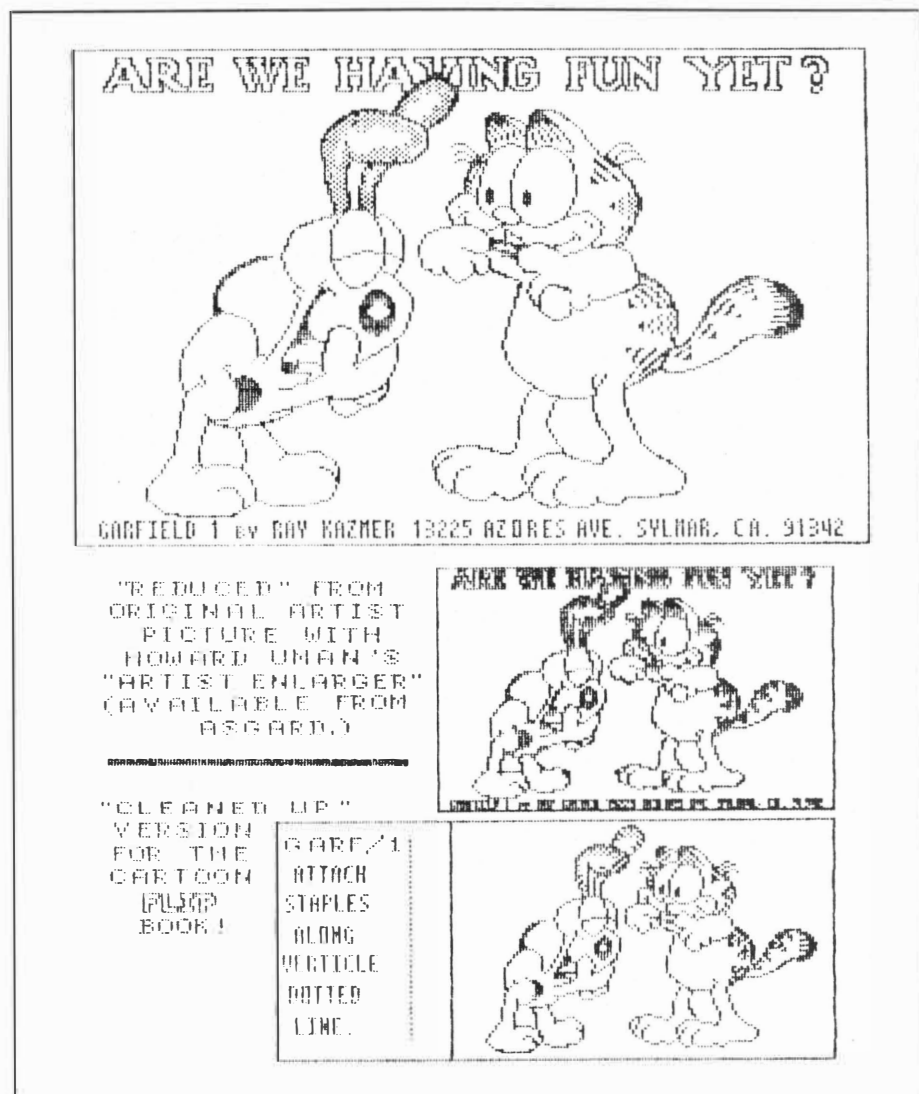
(See Page 33)

FLIPBOOK—

(Continued from Page 31)

(before photocopying) send me an initial-ized disk, with a stamped, self-addressed mailer to: Ray Kazmer, 13225 Azores Ave., Sylmar, CA 91342. If you live outside the USA, please include a dollar cash for the return postage.

If anyone wants to add a couple of extra dollars, I'll include a stand-alone animation demo of my full-sized, original drawings, which can be run on your 99/4A. Comments are always welcome.



ENLARGER—

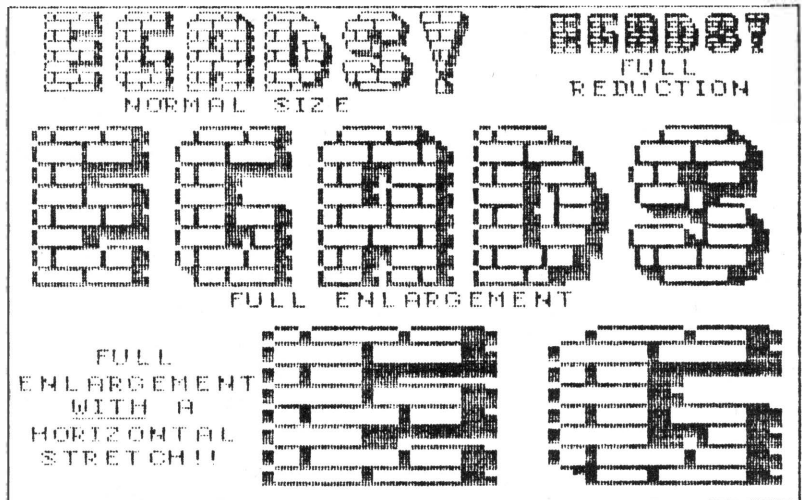
(Continued from Page 32)

Okay, exit to the main menu, and hit "1" for Instances (but this time, I used an existing filename.) Then I was asked for a "SAVE" name. After typing one in, I saw the "guts" of Artist Enlarger, this menu:

1. FULL ENLARGEMENT
2. HORIZONTAL STRETCH
3. VERTICAL STRETCH
4. FULL REDUCTION
5. HORIZONTAL SQUEEZE
6. VERTICAL SQUEEZE

It would take a million words to tell what each choice does, so I'll just put a few graphics in here and simply let everybody see this for themselves. I took one Instance (a clock) and pushed it through each "choice" Artist Enlarger offers.

While making the clock "examples," I noticed the program took a tad longer to do it's "magic" on some of them. (Ranging from 49 seconds, to just over two minutes.) The original "clock" is four sectors long.



I also tried it on a really BIG Instance.

With TI-ARTIST, I converted the first "frame" of my animated COMIC SHOW, from a 25 sector "—P" picture, to a 64 sector "—I" Instance and shoved that through a full reduction, just to see what would happen. It took 46 minutes and 51 seconds to do the job, and the results look-

ed a little "blotchy."

In all fairness, I must stress, that it wasn't Artist Enlarger that caused the "blotchiness." There just isn't any way to shove 4 pixels into a 1 pixel area without something getting plugged up. I'm no expert with TI-ARTIST, but it took only a

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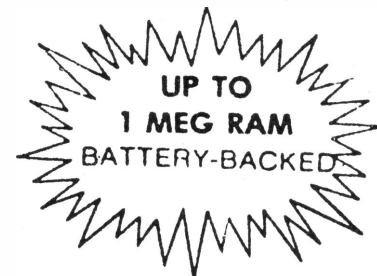
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---	---------

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---	---------

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ENLARGER—

(Continued from Page 33)

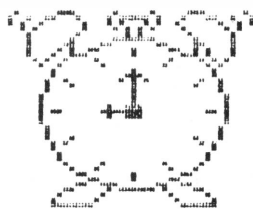
few minutes to clean up that case of the "blotchies." (See comparisons.) "Blotchie-fixing" is no bit deal.

As with so many other great, high-tech scientific discoveries, one thing leads to another. It was at this point, while I was

INSTANCE COMPARISONS



NORMAL SIZE



FULL ENLARGEMENT



HORIZONTAL STRETCH



VERTICAL STRETCH



FULL REDUCTION



HORIZONTAL SQUEEZE



VERTICAL SQUEEZE

looking at the reduced image on my screen, that I "flashed" on making a comic flip book. My creativity had been awakened, due to the fantastic capabilities of Artist Enlarger.

Still determined to make the program fail, I attempted a full enlargement on an Instance I knew was way too big already, one which nearly filled the screen, in its "primal" state. Once Artist Enlarger checked the size of the file I was trying to create, it stopped processing my deliberate "blunder" and told me: "FILE TOO LARGE. PRESS ANY KEY."

What about fonts? I used one of my own, called BRICKS (45 sectors long.) If you're familiar with TI-ARTIST, you'll know that 45 sectors is just about at the upper size limit for a font. Anything bigger than that, must be "split up" to be used by TI-ARTIST. This is done to prevent big fonts from overwriting TI-ARTIST itself and to reserve memory for your creations.

After a standard full reduction and full enlargement, taking a little over 30 minutes each, I tried a horizontal stretch on the already fully enlarged font. The monster I created was 153 sectors long and took 1 hour, 12 minutes and 26 seconds to pro-

cess. Artist Enlarger converted the entire font, even though only the first five letters (A-E) could be loaded into, and used by TI-ARTIST, at one time! The "frame" you see around my font example (and around my Instance examples) represents the outer edges of my screen, just to give you an idea, of how big the letters had become.

Although Artist Enlarger only shows its menu, while manipulating an Instance it writes: "NOW WORKING ON:" and the letter of the font it's converting. You can't see the results of your efforts until loading them into TI-ARTIST, later.

Again, in all fairness, I must stress, if these processing times sound too long to you, consider this: How long would it take you to enlarge an Instance or Font by hand? When I work on my TI, I'm really fast! But it would have taken me months to do what Artist Enlarger did, perfectly, in a little over an hour.

One final thought. It's frightening to an old gas-bag like me, to see what these young whippersnappers can do with computers these days! (Doggone you, Howard! I wish I had thought of writing Artist Enlarger.) I love it!

Bill Knecht dead at 41

Billy Wayne (Bill) Knecht, 41, of Pasadena, Texas, died July 9 in a Pasadena hospital after a long illness.

Funeral services were July 12 in Pasadena with the Rev. Ford Dawson of Sun-

set United Methodist Church officiating. Burial was in Grandview Cemetery.

Knecht was a self-employed square dance caller and computer programmer specializing in computer music. He was a member of the Houston Users Group and had served as sysop of the group's BBS.

His programs for the TI include Best Songs, Best Songs 2, Christmas Songs and VCR Movie Guide.

He was a former president of the Jaycess and caller for the Wildwood Squares. He was a charter member of the Bayshore Baptist Church of LaPorte, Texas.

He is survived by his wife, Kathleen Knecht of Pasadena; parents, Henry William and Ruth Knecht of Pasadena; sister and brother-in-law, Shirley and Fred Disch of Pasadena; niece and nephew, Chad and Annette Disch of Webster, Texas; niece and nephew, Robin and Darryl Camp of Pasadena; and great-niece Jessica Camp of Pasadena.

Amarillo group seeks Geneve 9640 users

The Amarillo 99/4A Users Group is trying to form a strong Geneve 9640 support group, according to Samuel R.M. Burton, the groups secretary and editor.

He says the group has two Geneve users in Amarillo and three others correspond with the group, which would like to get in touch with others.

Burton says the group is willing to provide starter packs for new groups of 12 or more "fledglings."

For further information, write the Amarillo 99/4A Users Group, P.O. Box 8421, Amarillo, TX 79114.

Newsbytes

Texaments relocates, sets TI BASE aid

Texaments has relocated its operations with the opening of a new office building in Yaphank, New York, and has announced a support program for its database program, TI BASE.

The new facility, 5,000 square feet larger than Texaments' previous location, is designed to provide space for additional personnel, inventory and manufacturing capabilities, according to Steve Lamberti, company president.

He said the five-year-old company is actively seeking programmers.

New address for Texaments is 244 Mill Rd., Yaphank, NY 11980. Phone numbers are (516) 345-2134 and (516) 345-2133 FAX.

The first phase of the TI BASE support program is a forum on TI SOURCE, the newly revised multi-user bulletin board system sponsored by Texaments, Lamberti says. TI SOURCE can be reached 24 hours a day at (516) 475-6463.

The second phase involves future add-on companion products for TI BASE, Lamberti says. He says an immediate need will exist for predefined command files (also known as templates or overlays), to allow novice users to use TI BASE without having to learn the program language. He says users are encouraged to submit original templates to Texaments for inclusion in future companion products. Only submissions on disks will be accepted. None will be used without the author's express consent, Lamberti says.

He says a bi-monthly TI BASE newsletter is now being considered.

Chicago group starts library exchange

The Chicago TI User Group is starting a library exchange program.

According to the group, the overall goal of the program is to supply all participating groups with all TI public domain software available. Plans are for the complete library to be available to all groups on completion of the project for the costs of disks and shipping.

User groups wanting to participate in the

exchange program should catalog their group's library on double-sided, double-density disks using the CATLIB disk catalog program. The Chicago group's library committee will compare the lists and send back a list of programs it does not have. The participating group will then copy those disks and send them to the Chicago group.

CATLIB library disks should be sent to Nick Iacovelli Jr., 1411 North 36th, Melrose Park, IL 60160-2726.

The group's 1988 TI-Faire will be held Nov. 12 at the Holiday Inn in Rolling Meadows, Illinois. For Faire information, contact Marcy Brun, 380 Park, Elgin, IL 60120 or (312) 695-9291.

Turbo-Pasc 99 shipping

L.L. Conner of L.L. Conner Enterprise said that Turbo-Pasc 99 was scheduled to ship in early July.

The program sells for \$59.95 and runs from Editor/Assembler option 5 or TI-Writer option 3. It requires 32K memory and a disk drive, Conner said.

L.L. Conner Enterprise is the sole North American distributor.

For further information, or to order, contact L.L. Conner Enterprise, 1521 Ferry St., Lafayette, IN 47904 or call (317) 742-8146.

Conference videotapes available to groups

A five-hour videotape of all the demonstrations at the recent Multi User Group Conference in Lima, Ohio, is available free to user groups.

Charles Good, librarian of the Lima 99/4A User Group, emphasizes that the tape is not available to individuals.

Demonstrations include the new features of Funnelweb v4.1, the new features of Disk Utilities v4.1, Norman Rokke demonstrating his "1000 Words" (which converts TI Artist graphics into files printable out of the TI-Writer formatter), and more.

To receive the videotape, groups should send a blank good quality videotape and a postage paid return mailer or \$6.50 (\$4 for the tape and \$2.50 first class postage) to Good at P.O. Box 647, Venedocia, OH 45894.

California Share-Fair planned for fall

A Fall-4-A-Share-Fair is planned from noon to 5 p.m. Oct. 9 in Placentia, California.

The event will be held in Room 7 on the lower level of the BACKS Community Building, 201 N. Bradford Ave., Placentia. The building is at the southeast corner of a park on the north side of Chapman Avenue, just north of the Riverside Freeway (Hwy 91) and just east of the Orange Freeway (Hwy 57), near the Brea Mall.

Bill Harms, one of the event's organizers, says software and hardware vendors will have products to sell and freeware and public domain software will also be available. Users are invited to bring any programs or hardware they want to swap or sell, he says. Door prizes will be awarded, he says.

He says barbecue pits and playground equipment will be available, and a soft drinks table will be set up.

For information, contact Harms at 6527 Hayes Court, Chino, CA 91710.

Sierra won't enforce TI99/4A copyrights

Ken Williams, president of Sierra On-Line Inc., wrote Stephen Shaw of the U.K. TI99/4A Users Group that Sierra is no longer in the TI99/4 market and that Williams does not "foresee circumstances under which we would enforce our TI99/4A copyrights."

Shaw had written Sierra regarding its Jawbreaker program.

Donaldson Software releases four games

Donaldson Software has released four new games for the TI99/4A, according to Floyd Donaldson, company president.

War of the Netherworlds is described as a two-player tactical war game in space. Using starfighters, intelligence satellites and battlestars, the players must battle for the conquest of the 12 moons. The Extended BASIC game is \$15.95 U.S.

Professional Blackjack is Las Vegas style blackjack, player against dealer, in high-

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Newsbytes

(Continued from Page 35)

resolution graphics. It is programmed in BASIC and sells for \$9.95 U.S.

Sapphire Dream is called a quest for riches by scavenging emerald mines in the Australian outback. The manufacturer recommends it for children 10 or older. Programmed in TI BASIC, it sells for \$9.95 U.S.

Dangerous Missions is described as a guerilla war game, circa 1942, far-east Asia. As a guerilla soldier trapped in Malaysia during the British withdrawal, the player selects weapons from his hidden cache to complete the missions assigned him by Gen. Douglas MacArthur. The game is programmed in TI BASIC and sells for \$9.95 U.S.

All programs are on cassette only and require no memory expansion. For further information or to order write Donaldson Software, 521 Lievre St., Buckingham, Quebec, Canada J8L 2C2.

TI club sponsor wins award in Maine

Eunice Spooner received a Technology in Main Schools Committee award in March for her work sponsoring the Oakland TI Computer Club at Atwood School in Oakland, Maine.

Spooner, a school board member and school volunteer, found second-hand TIs selling for \$20-25 so that each club member could have a computer at home. The computers are also available in the elementary school.

The club is open to members of any age, although most members are in grades 1-6, Spooner says. She says she would appreciate any help in expanding the program library and or its supply of hardware and software (such as Extended BASIC modules). The group has one DS/DD disk set while all the others are basic with cassettes.

The group meets at 7 p.m. on Mondays at the Atwood School library during the

school year, and at 12:30 p.m. during the summer. Meetings stress educational programs, BASIC and Logo programming, with one game meeting per month.

The club has a lending library of about 40 programs members can check out. Spooner spends 2½ days a week in the elementary school teaching computers to first through fourth graders.

Address for the club is The Oakland TI Computer Club, c/o Eunice Spooner, Box 3720, Waterville, ME 04901 or, at the school, The Oakland TI Computer Club, c/o Eunice Spooner, Heath St., Oakland ME 04963.

Spooner is also sysop of The Northeast-er, a BBS in Waterville, Maine, which uses the After Hours system by Ed Schaum. The board operates 24 hours a day, seven days a week, mainly for the TI, but will accept all others. It features Xmodem uploads and downloads. Phone number for the BBS is (207) 465-9065.

User Notes

Routine calculates day of week

Robert Neal, a member of the TI Users Group of Will County (Romeoville, Illinois) writes:

The following routines calculates the day of the week (ie. Monday, Tuesday, and so forth) from the date entered. I can see this being used in programs which make use of the date, such as database programs, BBS programs, accounting programs, etc. The real routine lies in the algorithm in lines 130-160 and easily could be incorporated into existing programs.

```
100 REM ** CALCULATES THE DAY OF WEEK FROM MM/DD/YYYY FORMAT ** !196
110 CALL CLEAR !200
120 INPUT "ENTER MM, DD, YYYY: ":M,D,Y !070
130 A=Y-(INT(Y/28)*28):: B=A/4 :: E=A-INT(B)*4 !085
140 C$="511462403513" :: IF E=0 THEN IF M<3 THEN C$="40" !155
150 E=VAL(SEG$(C$,M,1)):: IF
```

```
Y<1900 THEN A=A+12 !063
160 G=A+INT(B)+D+E :: F=G-(INT(G/7)*7) !150
170 DATA SUN,MON,TUES,WEDNES,THURS,FRI,SATUR !071
180 RESTORE :: FOR B=0 TO F :: READ C$ :: NEXT B !108
190 PRINT "TODAY IS ";C$;"DAY" !064
200 PRINT !156
210 INPUT "DO ANOTHER? (Y/N) ":YN$ !144
220 IF YN$="Y" OR YN$="y" THEN GOTO 110 !031
```

Making XB programs faster

This comes from Ray Kazmer, of Sylmar, California. He writes:

How many times have you seen coding like this in an Extended BASIC program? (The line numbers are fictitious and could be anywhere.)

```
500 IF SCORE > HIGH THEN HIGH = SCORE
```

Or, maybe something like this:

```
500 IF A=1 THEN A=2 ELSE A=1
```

IF-THEN and IF-THEN-ELSE statements not only take up lots of memory, they also slow down program execution speed. If you had a batch of them in a joystick loop, the stick's "reaction" would seem sluggish. There are better ways to do both of the above.

The first example is easy to fix. The answer is right in the Extended BASIC manual.

```
500 HIGH=MAX(SCORE,HIGH)
```

The second example is a "flag," used by a program to set, or to check a "condition." One example would be a two-player game, or even in a game you'd play against the computer. Flags let your console know whose turn it is to move, among other things. Why slow it down and fill lines with long IF-THEN-ELSEs?

Here's a fast, short and easy way to "switch" a flag from 1 to 2. OR. 2 to 1.

```
500 A=3-A
```

Suppose that "A" equals 1 when the program reaches this line. Here's what happens: 3-1=2. "A" (which was 1) has been changed to 2, without an IF-THEN-ELSE statement. If "A" equals 2, then it

(See Page 37)

User Notes

(Continued from Page 36)

would read: $3-2=1$ and it's switched back to 1, faster and with a sizable saving of memory. Try it, it works.

Want to save even more memory? You can leave the "SIZE" part out of your DISPLAY AT statements if you put a semi-colon at the end of the statement. Here's a simple little two sector program to show you how it works. (Note the ";" at the end of the "TEST 3" line.)

```
100 CALL CLEAR :: CALL COLOR(9,5,5) :: FOR A=1 TO 32 STEP 2 :: C
ALL VCHAR(1,A,96,24) :: NEXT A
110 DISPLAY AT(7,1):"THIS IS TEST
1" :: DISPLAY AT (11,1)SIZE(14):"
THIS IS TEST 2" :: DISPLAY AT(15,
1):"THIS IS TEST 3";
120 GOTO 120
```

c99 Calendar modifications offered

This comes from John Bonito of Jersey City, New Jersey. He writes:

From the June issue, I typed in the c99 Calendar program listed on pages 17-21. Although the program compiled and assembled without errors, I do get two errors in the printout. The first printed date line for the months of January and February contains only eight days, then a blank line is printed, then the program continues printing properly to the end of the year. The other 10 months print properly except that all 12 months have the first day of each month beginning on Sunday.

I have checked my typed source code against the program as listed and it appears to be the same.

Two typographical errors were discovered in the listing. The line "#include DSK1.FLOAT" would not compile properly with c99 Ver. 3.1 since the filename is FLOATC. Earlier compiler Ver. 2.0 had the filename "FLOATC". Also, on page 20, the eleventh line down in the right column, fprintf should be fprintf.

Counter with leading zeroes

If you ever need to display an up-counter which retains leading zeroes, try this routine by Glen Pedersen, of Harwood,

North Dakota.

```
100 CALL CLEAR
110 N=1E4
120 N=N+1
130 DISPLAY AT(10,13):SEG$(STR$(
N),2,4)
140 GOTO 120
```

In this routine the counter keeps adding to a large number (1E4) and all digits, except the first digit of that number, are displayed. In this way "leading" zeroes will always be displayed while the most significant digit of the large number (1E4) is never displayed. (1E4 is scientific notation for the number 10,000.)

In line 110 the number following the "E" indicates how many digits you want displayed. In line 120 the number added to N determines the increment amount (add 2 to make it count by twos or add 5 to make it count by fives, etc.). In line 130 the final number in the SEG\$ parentheses equals the number of digits to be displayed.

For a counter overflow monitor which will reset the counter to zero on an overflow, change lines 110 and 120:

```
110 N,NN=1E4
120 N=N+1 :: IF N>=2E4 THEN N
=NN
```

In both lines 110 and 120 the number following the "E" indicates how many digits are to be displayed.

Here is an application of the above. The Editor/Assembler module PRINT FILE function does not include statement line numbers in its listings, but here's an Extended BASIC "Print File" program that will:

```
90 REM ** "PRINT FILE" WITH
LINE NUMBERS ** !147
100 N=1E4 !129
110 DISPLAY AT(5,6)ERASE ALL
:"Assembly Language": : "
Source File Printout" !175
120 DISPLAY AT(18,2):"Filena
me: DSK1." :: ACCEPT AT(18,1
6)SIZE(-12)REF:FS !021
130 OPEN #1:"DSK"&FS,INPUT :
: OPEN #2:"PIO" !222
140 N=N+1 :: IF EOF(1)THEN C
LOSE #1 ELSE INPUT #1:AS :
PRINT #2:SEG$(STR$(N),2,4)&
" "&AS :: GOTO 140 !014
```

Tips on using Asgard's EZ-Keys

Ollie Hebert, of the South Mobile and Alabama Users Group (SMAUG), recently offered some advice on using Asgard Software's EZ-Keys in the group's newsletter. Here's what he had to say:

I have been working with EZ-Keys and attempting to get a few macros set up so that my Extended BASIC programming will require less effort. Perhaps my ideas will give you some insight into what you want EZ-K to do for you.

Some corrections first. On the Quick Reference Card that comes with EZ-Keys, it should read "EZKEYS" (not EZ-KEYS). The rest of these are for the instruction booklet. Page 5: CTRL-F (not FCTN). Page 9: LISTMACROS (not LISTMACRO). Page 11: CTRL 3, erases characters to the right of the cursor and the character under the cursor. FCTN 9: erases all characters to the left of the cursor.

You may readily modify the macros that are supplied with EZ-K or you may write your own new ones. Take a look at this modified version of the EZ-K catalog program. Its output is justified and it closes the file when there are 127 files. It also gives the formatted sectors size and gives the correct used and available counts (because it knows that sectors 0 and 1 are always in use). It fits onto the EZ-K editor screen, but it uses 19 more bytes than the original. However, the TI-Writer file is 1 sector smaller than the sample file and the program, though not quite a tinygram, is only four sectors longer when saved.

To write this program in TI-Writer: set Word Wrap to on. Set tabs: L at 0 and R at 33. Type CTRL-U @ CTRL-U for the space character; type CTRL-U M CTRL-U for the Enter character. Save with PF DSK#.FILENAME (not with SF DSK#.FILENAME). Install in EZ-Keys with the POKER program per page 9 of the instructions.

```
01 10DISPLAY ERASE ALL:"CATALOG DRV #?
02 "1160SUB 511CALL CLEAR11L$=RPT$(
03 " ",20)11OPEN#1:"DSK"&CHR$(B)&".",IN
04 TERNAL,RELATIVE,INPUT11FOR L=0 TO#
05 12711INPUT#11A$,S,J,K%
06 2IF L AND A$=""THEN L=12711PRINT L
07 11GOTO 4 ELSE IF L=0THEN PRINT L$
```

(See Page 38)

```

08 : "Drive";B-4B; "DiskName ";A$;"Fmt"
09 ;J+2; "Usd";J-K+2; "Avbl";K;L$;"File
10 Name Sect FileType P"; : :60T
11 0 4.
12 3PRINT USING "#####.#####.#####.#####
13 #####.#####.#####.#####.#####.#####
14 INT/FIXINT/VARPROGRAM",ABS(S)*7-6,
15 7)&SE$$(STR$(K),1,K),CHR$(85+3*(S<
16 6))):CALL KEY(0,K,S):IF S THEN GO
17 SUB 54.
18 4NEXT L:CLOSE#1:!!P-4.
19 5CALL KEY(0,K,S):IF S<1 THEN 5 EL
20 SE IF L=128 THEN END ELSE IF L THE
21 N RETURN ELSE IF K<49 OR K>52 THEN
22 4. ELSE B=K:RETURN.
23 RUN.112535.4454.

```

```

10. 10CALL SCREEN(10)::FOR I
-30 TO 0 STEP-1::CALL SOUND(
-99,999-(1*20),1)::NEXT I:SA
VE DSK1.!!BACKUP

```

```

1.  '3'4CALL SCREEN(10);:FOR I
-30 TO 0 STEP-1::CALL SOUND(
-99,999-(I*20),1)::NEXT I:SA
VE DSK2.'BACKUP

```

TINYSONAR is challenging

In addition to writing tinygrams, Stanfill is the organizer of such well-intentioned Special Interest Groups as "Tinygrams: The Search for Mediocrity!" or "How I Wasted Five Years Writing Teensy-Tiny-Itsy-Bitsy-Teeny-Weeny Programs That I'm Not Sure Are Understood or Even Used by the Broad Majority of People

The game ends when you strike an iceberg. The number of subs sunk will be displayed at this time.

```

1  !***TINYSONAR*****
   !***A TINYGRAM*****
   !***BY MIKE STANFILL****
   !***DALLAS TI USER GROUP** !

224
2  CALL CLEAR :: RANDOMIZE ::
   FOR T=2 TO 24 :: CALL SPRIT
E(#T,64,2,T*8-7,RND*254+1,0,
RND*10-4,#25,79,2,1,125):: N
EXT T :: DEF G=INT(RND*3)-1
!034
3  CALL SPRITE(#27,33,1,RND*1
91+1,RND*255+1,G,G)!064
4  CALL KEY(1,K,S):: IF S TH

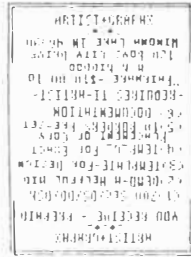
```

Slashing the zero in Multiplan

User Notes is a column of tips and ideas designed to help readers put their computers to better use.

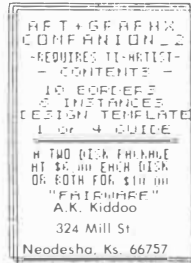
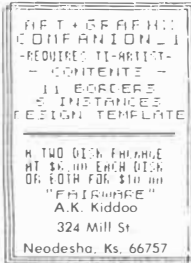
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DALLAS, TX. 75214, 214 821 9274	v5,n6

USERS GROUPS

The following are additions and updates to our user group listings, which we began publishing in the May 1987 issue.

Colorado

Rocky Mountain 99ers, 1825 E. 113th Ave., Northglenn, CO 80233 (new address). Mark Payne, president. New BBS number is (303) 450-5285.

Georgia

Atlanta T199/4A Computer Users Group, P.O. Box 19841, Atlanta, GA 30325. Phone (404) 231-0992. BBS numbers (404) 991-6250 and (404) 366-1914.

Maine

The Oakland TI Computer Club, c/o Eunice Spooner, Box 3720, Waterville, ME 04901 or c/o Eunice Spooner, c/o Eunice Spooner, Heath St., Oakland ME 04963. Meets at 7 p.m. Mondays during school year, 12:30 p.m. Thursdays during summer at Atwood School library, Oakland. Most members elementary school children but open to all. Library, newsletter. No dues.

Texas

Amarillo 99/4A Users Group, P.O. Box 8421, Amarillo, TX 79114. Samuel R.M. Burton, secretary/editor, (806) 352-4778. Meets 7 p.m. second Monday at Amarillo Main Branch Library, Third and Buchanan. For T199/4A, Geneva 9640. Annual dues \$18.

Outside U.S.

Sweden

Computerclub West 99, P.O. Box 8897, S-402 72 Gothenburg, Sweden. Bertil Stenfeldt, president. Phone 46-031-562373. West 99 BBS, 300-1200 baud, using TI-Net, 1700-2300 (local time Sweden). Phone 46-031-917004. Sysop is Sten Gunnarsson.

Texas Instruments

T199/4A

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